BOOK 110

Notes:
"U F_6 1973, 74" on spine

Blank pages: inside front cover, 56, 57, 123-165, inside back cover.

pages 4, 8 has drawing taped to each
pages 6, 9, 25 has table taped to each
page 7 has small drawing taped to it
pages 10, 12, 15, 29, 32, 36, 38, 40, 42, 49, 50, 54, 58, 62, 64,72, 84, 106 has picture taped to each
page 26 has drawing taped and 1 8.5x11" sheet taped to it
pages 34, 39, 99 has small graph sheet taped to each
pages 43, 111 has 2 small graph sheets taped to each
page 48 has picture and notebook sheet covering picture taped to it
pages 68, 121 has 8.5x11" sheet taped to each
pages 86, 95, 101, 120, have 2 pictures taped to each
page 122 has picture and table taped to it

There are 9 8.5x11" sheets stapled together folded in back of logbook.

Scanned by:
Sheila Finch
RSICC /Oak Ridge National Lab.
January 9, 2001

Y-DR-128 DOES NOT USE THE SAME EXP. # as we in this log. See Report for "tie ins". Also see below:

#128 TABLE 4	EXP # Y-DR 128 #	EXP # in log Book
	(1)	12
	(2)	16-17
	(3)	18
	4 }	19-22
	5 }	
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	9	26
	10	27
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	15	33
	16	34
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	18	38c
	19	38e
	20	38f
	21	38g
	22	38h
TABLE 7	23	39b
	24	39c
	25	39d
	26	39h
Table 8	27	40c
	28	40e
	29	40g
Table 9	30	41a
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	32	41o
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	34	41q
	35	41r
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	37	42b
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	39	43b
Table 10	40	44A
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cont

TABLE 11	47	49B
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	49	49E
	50	49F
TABLE 12	51	50G
	52	50H
	53	50I
	54	50J
TABLE 13	55	50o
	56	50TD
	57	53A
	58	53D
	59	53E
	60	53F
	61	53G
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TABLE 14	63	54D
	64	54E
	65	54F
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	68	55F
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TABLE 16	71	58A
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	74	58D
	75	58M
TABLE 17	76	58N
	77	58o
	78	58P
TABLE 18	79	58H
	80	58K
	81	58L

This is log for → Report #
Y-DR-128

10-9-23

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— OTHER ITEMS —

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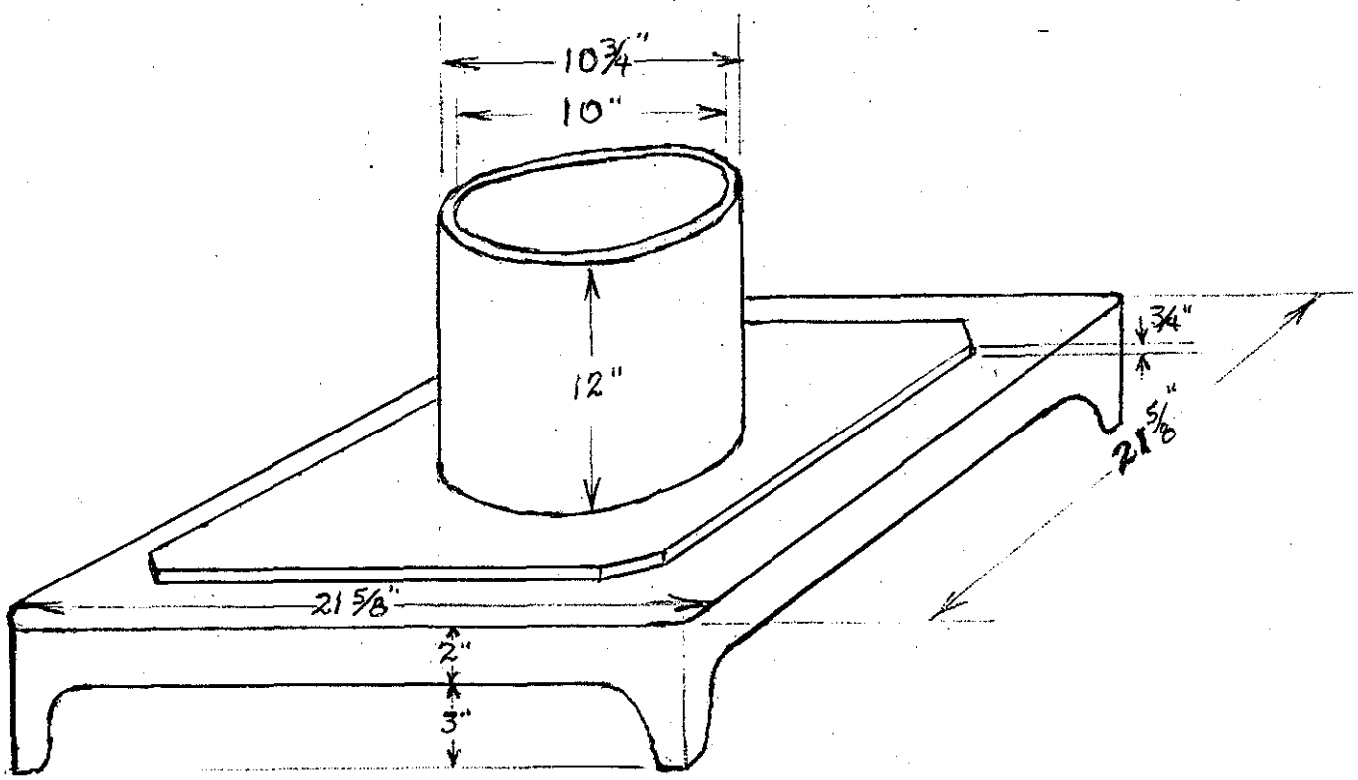

10¾"
10"
12"
¾"
21 5/8"
21 5/8"
2"
3"

23 Aug 73 — As per memorandum dated 23 Aug 73, eight UF6 cylinders will leave Portsmouth on thursday 30 Aug 73 and are expected to arrive at Bldg 9213 on Fri. 31 Aug 73. Originating party is Bill Bryon. These cylinders should be removed from their protective shipping packages and stored on 3-4 ft centers. Ed Owings will handle any special instructions with respect to the shipment.

27 Aug 73 — Wilkinson will have Bill Mee over to 9213 tomorrow to discuss storage situation. i.e. the 1st 8 cylinders as well as the remaining 29 cylinders.

28 Aug 73 — Bill Mee thinks he can find some suitable cylinder holders for storage at K-25.

29 Aug 73 — Holders were found and 38 are expected to be delivered to 9213 on the 30 Aug 73.

30 Aug 73 — Instrumentation of East facility is being checked by Rohrer.

25 - not 38 holders were delivered and were checked for contamination. They are in pretty good shape but are oily and will be cleaned tomorrow.

These holders are made of al and are very sturdy. The base (with legs) is constructed from 1/2" al. The 3/4" thick al plate is fastened flat on to the base with 4 bolts. The 10" I.D. al pipe is welded to the 3/4" thick al plate.

See Pg 4 for sketch of holder.

6

AUG 31 1973 Cleaned and prepared 8 containers. Received 8 cylinders of UF6 as follows.

RADIATION LEVEL
MAX. WIPE 0 C/M/ 100 cm² (SAMSON METER)
MAX. MR/HR 0.2 @SURFACE 0 @ 1 METER / TRANSPORT INDEX
ACTIVITY 56544 MC

PROJECT NO.

Nº 5811

MATERIAL DESCRIPTION
ENRICHED UF6 ORDER OF NET WT OF 16 CYLINDERS

PSP NUMBER	GROSS WT. INCL. PSP (POUNDS)	SEAL NUMBER	CONTAINER NUMBER	UNIT OF MEASURE- CONTAINER ☑ POUNDS ☐ GRAMS ☐ GROSS WT.	TARE WT.	NET WT.	% URANIUM ANALYSIS	WT. % U-235
FR8-007 ✓	12	GAT-1205 GAT-2122	08-0351 ✓	345.85	100.05	245.80	67.31	97.66
FR8-004 ✓	10	GAT-1061 GAT-2673	08-0451 ✓	341.75	97.25	244.50	67.30	97.65
FR8-005 ✓	13	GAT-1669 GAT-2709	08-0453 ✓	345.40	99.45	245.95	67.31	97.66
FR8-008 ✓	1	GAT-1083 GAT-2734	08-0460 ✓	340.45	102.30	238.15	67.30	97.67
FR8-020 ✓	3	GAT-1866 GAT-2748	08-0462 ✓	340.90	98.65	242.25	67.30	97.67
FR8-003 ✓	11	GAT-1696 GAT-2758	08-0475 ✓	346.10	100.70	245.40	67.31	97.66
FR8-009 ✓	6	GAT- 1196 GAT-2797	08-0491 ✓	344.45	101.55	242.90	67.30	97.67
FR8-006 ✓	5	GAT-2551 GAT-2877	08-0494 ✓	342.65	99.75	242.90	67.30	97.66
						1947.85		

Removed from their shipping containers and stored on 3 ft centers in Processing Room # 108. The containers were returned @ about 14[15] hrs.

SEP 1973 W. J. Leggins (3-7267) "looked" at table & will make load calc.

SEP 10 1973 With no load on the table, the following observations of the vertical space between the roller and the rail were made of the #12 & #9 roller →

	DISTANCE FROM CLOSURE (2in)	ROLLER #9 (2in)	ROLLER #12 (2in)
	52.6	.033	.0005
additional shimming was added to:	40	.023	.007
	30	.020	.010
#9 = 16 mils	20	.014	.010
#10 = 11 mils	10	.006	.009
#11 = 5 mils	6	.009	.009
#12 = 11 mils	4	.007	.009
	3	.007	.009

SEP 11 1973

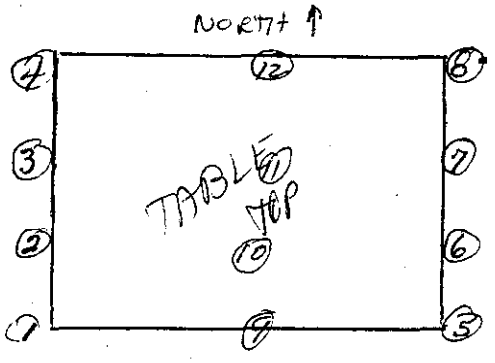
Load testing of table indicates a problem of alignment at wts. above 3500 lbs. It functions good up thru this weight. Higher weights cause improper motion (also noting that ~~the~~ some rollers are biting slightly into the inside of the track in some places.

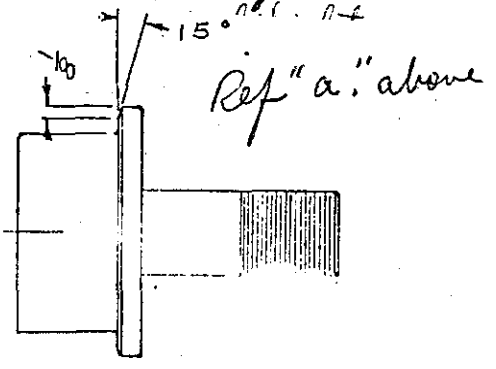
→ See Log FFE 1011 (Inst. file) for complete details of the measurements.

SEP 12 1973 Don Palkowski (3-7776) from Engineering came mail Stop #3, Bldg #9733-1 and rendered advice for the remedy of the problem (mostly a confirmation of our own conclusions).

a. cut a slight angle on the roller guides.
b. Create a small radius on the inside edge of the track.
c. Use only the 4 corner rollers (1-4-5-8) as guides allowing all other rollers to only carry weight.
d. Slot the roller wheel frame screw holes to allow adjustment.
e. grease track well to reduce friction.

Removed the rollers on the east & west sides and marked all positions of same.

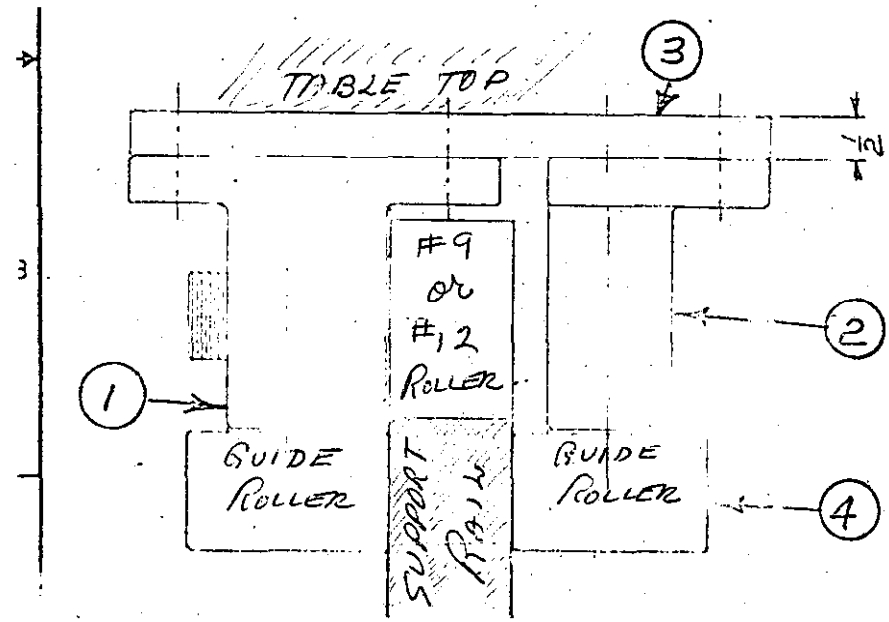




c.
d
e
→

#10 & 11

It has been decided to replace rollers 1 → 4 & 5 → 8 with new ones without guides. Positioning guides will be side rollers to be used at #9 & #12 only. See pg 8 for sketch of side rollers.



Reference Bottom Pg 7

SEP 24 1973 Made traverses vertically on each of the 8 original UF6 cylinders. i.e. I used a 4 mc 137Cs source on one side of cylinder and a CDV-700 detector on the other (appropriately collimated) and observed with plots the shielding effect over the range of interest. - what is the "shape" of the top of the material and where is it?

SEP 26 1973 Received 16 rollers (ref bottom Pg 7)

OCT 1 1973 Received 8 more cylinders of UF6 and stored in Rm #113 Nos: 0804233, 437, 438, 439, 468, 485, 483, 492. The empty shipping containers were returned about 12:30. See listing top Pg 9.

RADIATION LEVEL
MAX. WIPE 0 c/m/100 cm² (SAMSON METER)
MAX. MR/HR 0.2 @ SURFACE 0 @ 1 METER / TRANSPORT INDEX
ACTIVITY 56896 MC

PROJECT NO.

№ 5856

MATERIAL DESCRIPTION
Enriched UF6 ORDER OF NET WT OF 16 CYLINDERS

PSP NUMBER	GROSS WT. INCL. PSP (POUNDS)	SEAL NUMBER	CONTAINER NUMBER	UNIT OF MEASURE-CONTAINER [X] POUNDS [ ] GRAMS [ ]			% URANIUM ANALYSIS	WT. % U-235
				GROSS WT.	TARE WT.	NET WT.		
FR8-003	16	GAT-2730 GAT-2510	08-0423	350.45	100.55	249.90	67.30	97.65
FR8-004	8	GAT-2568 GAT-2564	08-0437	346.05	102.20	243.85	67.30	97.65
FR8-005	14	GAT-2527 GAT-2566	08-0438	345.30	98.40	246.90	67.30	97.66
FR8-006	9	GAT-2582 GAT-2723	08-0439	345.30	100.80	244.50	67.30	97.66
FR8-007	15	GAT-2787 GAT-2855	08-0468	346.20	98.75	247.45	67.31	97.66
FR8-008	4	GAT-2899 GAT-2862	08-0483	341.15	98.55	242.60	67.30	97.66
FR8-009	7	GAT-1170 GAT-2964	08-0485	341.90	98.40	243.50	67.29	97.66
FR8-020	2	GAT-1089 GAT-2981	08-0492	342.40	100.80	241.60	67.30	97.66
						1960.30		

NOV 7 1973 As of today all 16 cylinders have been radiographed. Results are not too significant but does show to some degree the height of the material in the cylinder and to some extent the shape of the top of the material.

NOV 1973 Magnuson gave Taylor & Lynn a dissertation on the steps & procedure concerning the UF6 experiment. Steps which may be taken once the exp. plan is approved.

10

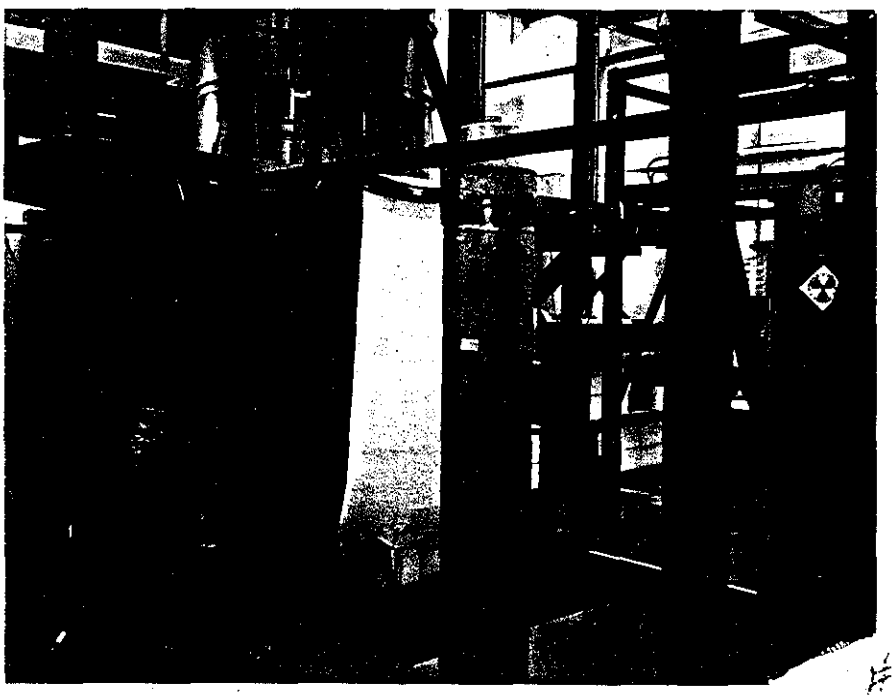
NOV [illegible] 1973

Instrument Check on 14 Nov 73 Source ^{60}Co #20 (± 29mc)

by J.R. Taylor & J.J. Lynn.

PM-1	875 V.	Low Trip	OK (12")	Trip	OK contact
IC-1	3×10^{-10}	Meter Trip	OK contact	Fast Trip	OK
IC-2	3×10^{-10}	Meter Trip	OK contact		OK
IC-3	8×10^{-10}	Calibration	.8 contact	A	OK
IC-4	7.5×10^{-10}	Calibration	.75 contact	B	OK
				C	OK

Made Check of instrumentation - Very good.
Made initial set up of first configuration to be run. i.e. Brief MTG cylinder on each table.
#492 on movable table; #438 on stationary table.
Rohrer installed 2 BF_3 counters



#1

EXPERIMENT PLAN (5-12, E-11).

Instrument Check on NOV. 16 1973 Source 60Co #20 & PuBe #525
Taylor & Lynn

1c) PM-1 875 V Low Trip END @ 6" (SCRAM) Trip OK @ contact

In pan.	IC-1	3X10^{-10}	Meter Trip OK contact	Fast Trip OK
In pan.	IC-2	3X10^{-10}	Meter Trip OK contact	OK
In pan.	IC-3	3X10^{-10}	Calibration OK contact	A OK
	IC-4	1.6X10^{-9}	Calibration OK contact	B OK
		Run 113 - neg pres	Area Cleared	C OK

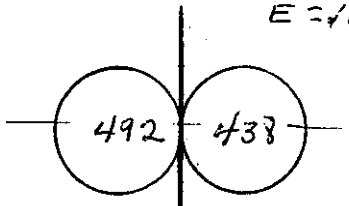
BF_3 #1 OK
BF_3 #2 OK

NOTE: Spacing of cylinder walls = 0.415" when the "footrings" are in contact

EXPERIMENT #1 CYLINDER #492 ON MOVABLE
#438 ON STATIONARY i.e 1 X 2

SUB No inst. response at closure. W = 100 digilin
E = 101

BF_3 #1 = 4773 CPM
BF_3 #2 = 1232 CPM

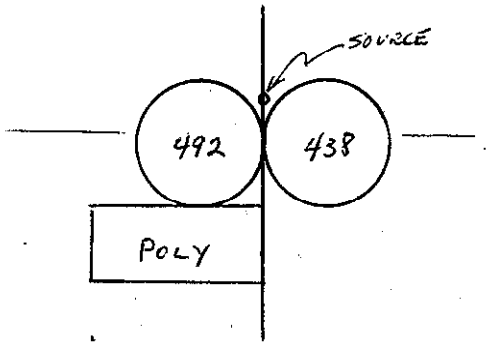


EXP #2 add 30" high x 12" x 6" poly wall at contact on West side of #492.

SUB No inst. response i.e. no increase @ closure

BF_3 #1 = 4675 CPM
BF_3 #2 = 1279 CPM

digilin = same.



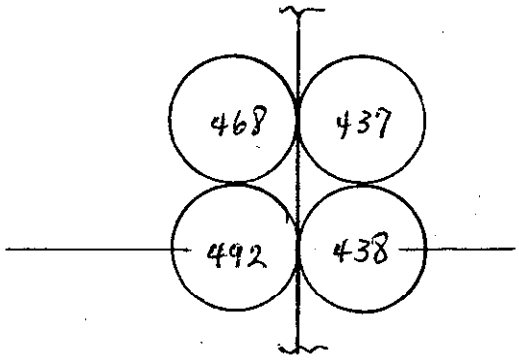
EXP. #3 Add 2 cylinders i.e. 2 x 2 array

BF_3 #1 = 5745 CPM
BF_3 #2 = 1324 CPM } @ 16" separation

SUB Some multiplication observed @ closure on all detectors.

digital = same

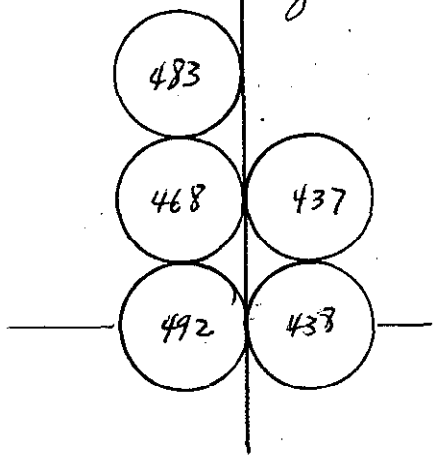
BF_3 #1 = 9207 corr .000109
BF_3 #2 = 2419 CPM .00041



#4

Exp #4 Add one cylinder

SUB



BF_3 #1 = 11604 cpm .000086
#2 = 3438 cpm .000291

SUB

See picture bottom Pg 12.

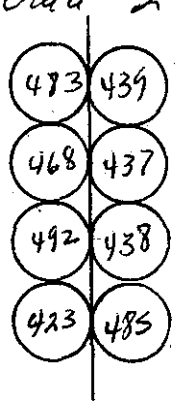
Exp # 5 Add one cylinder ∴ 2 x 3 array
i.e # 439 added to above "blank"

SUB

BF_3 #1 = 16546 cpm .0000604 BF_3 #2 = 4367 cpm .000229

Exp #6 Add 2 cylinder ∴ 2 x 4 array

SUB



.000 0373
BF_3 #1 = 26802 cpm
#2 = 7031 cpm
.000142

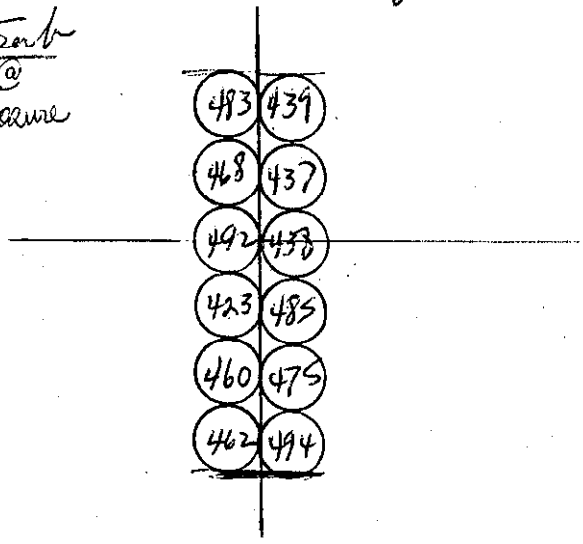
14

Instrument Check on NOV. 19 1973 Source 60 Ci #220 #PuBe #525
Taylor & Lynn

FM-1 875 V Low Trip 6" & Touch Trip OK
FM-2 _____ _____ _____
IC-1 3×10^{-10} Meter Trip OK Fast Trip SCRAM OK
IC-2 3×10^{-10} Meter Trip OK OK
IC-3 2×10^{-9} Calibration OK A OK
IC-4 5×10^{-10} Calibration OK B OK
BF$_3$ #1 OK BF$_3$ #2 OK C OK
Run #113 = neg pers. Area Cleared

EXP #7 Add 4 cylinders array = 2 x 6

Sub @ Closure

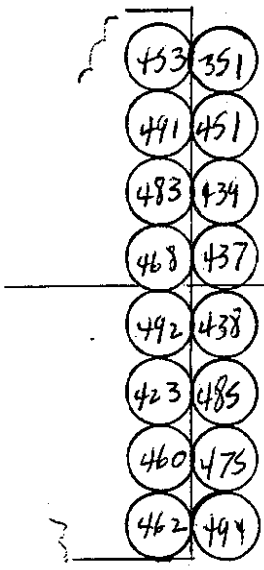


	Bkg @ 56"	50 in	0"
IC #2	9		42
3	.02		.06
4	.0038		.018
BF$_3$ 1	4590 cpm	10 min	45773
	4590		45278
2	3210	5 min	14569
	3210		14507

Exp #8 Add 4 cylinders array = 2 x 8

Sub-

closure digitals: West: 101; East: 102



	Bkg	@ closure
IC #2	— x	
IC #3	0.026	0.1
IC #4	0.007	0.028
BF_3 #1	8693	75232 - 74980
#2	6076	23623 - 23572

	Scale	@ closure 20. m.	50 cnt	54" Sep
IC #1	10×10^{-11}	61	34	6.0
IC #2	3×10^{-10}	61	31	6.0

73
78
69
7

EXP 8

NOV. 20 1973

Instrument Check on _____ Source ^{60}Co #20 & PuBe #525
Taylor & Lynn

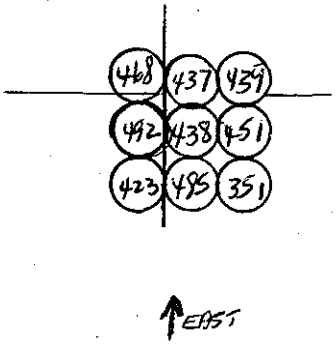
FM-1 875 V Low Trip OK Trip Hi (SCRAM)

IC-1	3×10^{-10}	Meter Trip	OK	Fast Trip	OK
IC-2	3×10^{-10}	Meter Trip	OK		OK
IC-3	2×10^{-9}	Calibration	OK		A OK
IC-4	5×10^{-10}	Calibration	OK		B OK
	BF3 #1 OK	BF3 #2 OK			C OK

Rm #113 = Neg Press Area Cleared

EXP #9 Array = 3 X 3

Sub

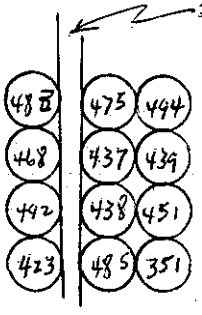


Det	54" No Source	54" Sc. In	0" Sc. in	0" Sc. Out
BF_3 #1	10330 CPM	16235 CPM	76800 CPM	35006 CPM
BF_3 #2	2865	3911	15610	6767
IC 1	10×10^{-11}	14	3×10^{-10}	10×10^{-11}
2	9	27.5	25	35
3	10×10^{-11}	1.9×10^{-11}	3×10^{-10}	10×10^{-11}
4	16.5	5.4×10^{-12}	27	48.5
	1.2×10^{-11}		9×10^{-11}	4×10^{-11}
	3.4×10^{-12}		2.1×10^{-11}	9.5×10^{-12}

EXP #10 Add #475 on east side of #437. (See EXP #9)

Sub @ closure BF_3 # 1 130593 CPM
2 26305
IC 3 1.5×10^{-10}
IC 4 3.3×10^{-11}

EXP #11 Super



Array = 3 X 4

Super-Crit Sel East: 1.179 West 1.173
IC 3 = +259 sec. +4.34¢
IC 4 = +267 sec +4.20¢
DC (∞) EAST: 1.192 West 1.186

SPACING CHANGE: 13 mils
AVG. POS. PERIOD = 4.27¢
} # 3.28 per in @ 1.089" separation

Due to need to override the built-in neutrons, it is necessary to move all detectors "away" in order to assure non-saturation.

Exp # 12 Repeat of #11

Super

Positive Period @ Delayn W = 1.097 E = 1.102 (digilin)
IC 3 = +366 sec 3.18¢
IC 4 = +370 sec 3.15¢
k > 1 (3.17¢) @ 0.999"

DC (∞) @ Delayn W = 1.107 E = 1.112
+ to ∞ = 10 mils = 3.17¢ or ¢3.17 per in
k ∞ @ 1.009"

Exp # 13 Remove cylinder # 494 (see Exp # 11)

Sub All inst, are now out of their "pigs" of paraffin.

	Sc. Out	Sc. In
BF_3 # 1 =	216015	488693
2 =	44124	101588

NOTE: All flanges touching @ contact (i.e. no array spacing Exp 1 thru 13.

Exp # 14 Swap positions with #423 & 438
Put 1/8 inch spacers between all cylinder "flanges" bottom & top.

Sub

Sub but "very close" at closure.
The top flanges of the cylinders along edge of table not spaced exactly all other exact 1/8".

Spacing of 1/8" actually 128 mils

482	475	494
468	437	439
492	423	461
438	485	351

k > 1 (4.27¢) @ 1.075"
k ∞ @ 1.079"

18 Exp # 15

Sub

Repeat Exp #14 but using 1" dia x 1/4" thick poly disc @ ℄ of cylinder (fuel) on south side of configuration for shim. Also made 1/8" spacing at top of cylinders along edge of table which had not been made before.

#15 is more sub than #14 and the shim is insufficient to get enough power so that a negative period might be measured.

Cd was added to one side of IC 3.

k>1 (9.564) @ .256"

k = @ .390"

k<1 = .317"

k>1 (8.754) @ .256"

k<1 (0.47⁴) @ .290"

Instrument Check on NOV. 2 1 1973 Source ^{60}Co #20 & Ra BE #525

PM-1 875 V Low Trip O/C Taylor & Cross Trip O/C

IC-1 3×10^{-10} Meter Trip screen O/C Fast Trip O/C

IC-2 3×10^{-10} Meter Trip O/C

IC-3 9×10^{-10} Calibration OK Alarm A O/C

IC-4 4×10^{-10} Calibration O/C B O/C

RF #1 O/C RF #2 O/C C O/C

Rm #113 = neg press. Dan Clark

Exp #16 ② IC 3 is now surrounded with a sheet of Cd. IC 4 is horizontal on floor & to side & to 1 is covered with cd.

Suppl Made 1/16" (63 mil) spacing thruout the 3 x 4 array. See cylinder numbers Exp #14

	west	east	IC 3	IC 4
→ Positive (+)	.353	.361	99.8 sec (9.67#)	102.6 sec (9.45#)
DC (∞)	.386	.394	∞	∞
→ Neg (−)	.414	.422	×	×

from + to ∞ = 33 mils or 9.56# ∴ #2.90 per inch

Exp #17 ② Repeat Exp #16 Go to "high" level to ascertain Δn & saturation levels of IC 3 & 4.

			IC #3	IC #4
→ digilin	W .354	E .360	+113.8 sec, 8.71#	+112.7, +8.78#
→	.386	.396	−290.3 sec, −.45#	−266.8 sec, −.49#

from + to − = 34 mils or 9.22# ∴ #2.71 per inch

Other high level recordings: Rm IC 3 = 120.0 (cd cvd) or 1.2×10^{-7}

IC 4 : (cd cvd) 6×10^{-8}

PM @ min. voltage or 425 V

Spot written = 10 mR/hr in Rm #112

Bldg A = 5K, B = 20K, C = 7K

Conf = 3½ R/hr one min after separation

Taylor & Lynn

Instrument Check on NOV. 26 1973 Source ^{60}Co 20

PM-1 875 V Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip SCRAM OK

IC-2 3×10^{-10} Meter Trip OK

IC-3 1×10^{-9} Calibration OK BLDG ALARM A ✓

IC-4 1×10^{-9} Calibration OK Rm #113 = neg. pres. B ✓

BF_3 #1 OK BF_3 #2 OK Area Cleared C ✓

A small amount moderator has been added to IC 3 & 4.

Exp #18 (3) Change spacing to 82 mils

	West	East	IC 3	IC 4
Positive (+)	.294	.300	+12.994 (67.6 rad)	11.569 (79.0 rad)
∞ (DC)	.338	.344	∞	∞

from + to ∞ = 44 mils = 12.28¢ or ¢2.79 per inch

$k > 1$ (12.28¢) @ 0.196"

k_∞ @ 0.240"

Exp #19 (4)(5) Change spacing to 113 mils

Did not run together due to deciding to make a better alignment. Went to about 100 mils separation with substantial multiplication.

$k > 1$ (26.32¢) @ .002"

k_∞ @ .075"

$k < 1$ (8.59¢) @ .098"

Instrument Check on NOV. 27 1973 Source 60 Co #20
SCT & SL

PM-1 825 V Low Trip SCRAM OK Trip OK

IC-1	3X10⁻¹⁰	OK	OK
IC-2	3X10⁻¹⁰	OK	OK
IC-3	1X10⁻⁹	OK	Bldg alarm A ✓
IC-4	1X10⁻⁹	OK	B ✓
	BF3 #1 OK	BF3 #2 OK	C ✓

Run #113 = neg. pres Area cleared

EXP #20 Spacing still 113 mils.

West	East	IC #3	
.134	.139	+32.6 sec	+21.08¢

Though the table lacks 32 mils being closed, the cylinders appear to be "closed."

EXP #21 Make slight realignment TEMP = 20.8°C

	West	East	IC #3	
closed (+)	.102	.102	+56.1 sec	+14.75¢
DC (∞) @ .046"	.145	.149		∞
Neg (−)	.166	.170	−192.2	−8.46¢

IC 1 (8.46¢) @ .067"

∴ from ∞ to − = 21 mils = −8.46¢ or ¢4.03 per inch
∴ from + to ∞ = 45 mils = +14.75¢ or ¢3.28 per inch

EXP #22 (4-5) Repeat EXP #21 Tighten up some more.

closed (+)	.102	.105	+23.16 sec	+26.32¢
DC (∞)	.174	.180		∞
Neg (−)	.197	.203	−190.0 sec	−8.59¢

from + to ∞ = 73.5 mils = 26.32¢ or 0.358¢/mil → .366¢/mil
from ∞ to − = 23 mils = 8.59¢ or 0.373¢/mil

Lynn + Cross

Instrument Check on NOV. 28 1973 Source 60Co #20

PM-1 875 Low Trip ok Trip ok Scram

IC-1 3×10^{-10} Meter Trip ok Fast Trip ok

IC-2 3×10^{-10} Meter Trip ok Bldg. Norm.

IC-3 8×10^{-10} Calibration ok A = ok

IC-4 9×10^{-10} Calibration ok B = ok

air press. - ok Red lite - ok C = ok

Exp #23 (6) - Exchange cyl #460 (238.15 lbs) for #423 (249.90 to see if reactivity difference can be measured. Found base of cylinders to be different sizes. ∴ reactivity differences will be in question. See p. 17 for cylinder locations.

On positive period - W = .426 E = .432 ~~T = 23.16 Per~~

W = .497 E = .504 ρ = 25.

ΔS = 71.5 mils

Δρ = .278 ¢/mil

k ∞ @ 0.399"

k > 1 (25.73¢) @ 0.327"

Instrument Check on DEC. 3 1973 Source ^{60}Co #20 Taylor & Lynn

PM-1 875 Low Trip ~~OK~~ OK Trip OK

IC-1 3×10^{-10} Meter Trip SCRAM OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Alarm

IC-3 1.3×10^{-9} Calibration OK A - OK

IC-4 1.3×10^{-9} Calibration OK B OK

air pairs (-) Red Lite OK C OK

482	475	494
468	437	439
492	423	451
438	485	351

(70 lbs)

IC ∞ @ .051"

EXP #24 (7) Super

	West	East
closed (+)	.101	.102
IC (∞)	.151	.155

T = 19.4°C

IC #3

47.4 sec +16.99# .333 #/mil

∞

outside total length EW from 485 → 475

NS from 475 → 494

485 → 351

#	Bottom	± ℄ UF6	± Top of UF6
485 → 475	90.3 cm	90.5 cm	90.4 cm
351 → 494	89.2	88.8	89.0
438 → 482	89.4	89.4	89.4
475 → 494	44.0	44.0	43.9
485 → 351	44.2	44.3	44.2

C.D. measurements

#	Bottom flange	± ℄ UF6
485	8.460 in.	8.397 in.
475	8.950	8.407
494	8.800	8.426
439	8.857	8.365
438	8.930	8.450
483	8.890	8.455
Avg	8.898	8.417

∴ Avg ℄ to ℄ = 8.951" or 22.736 cm

EXP #25 (8)

482	475	494
468	437	439
492	438	451
(423)	485	351

Put #423 on corner and #438 in its place. see "left."

Space between 492 & 423 = 532 mils @ ℓ of UF_6

	west	East
[redacted] (+)	.552	.558
DC (∞)	.593	.600

IC #3
+55.73sec; +18.86#

41.5 mils = 18.86# ΔP = 0.454#/mil

k_∞ @ 0.495"

$k > 1$ @ (18.86#) @ .453"

EXP #26 (9)

Remove #423 from configuration. 249.90 lbs UF_6
Add #460 in its place. 238.15 lbs UF_6

	west	East
positive (+)	.618	.623
DC (∞)	.680	.686

IC #3
+29.31sec; +22.47#

62.5 mils = 22.47# ΔP = 0.360#/mil

k_∞ @ 0.581"

$k > 1$ (22.47#) @ 0.519"

EXP #27 (10)

Remove #460
Replace with #462

242.25 lbs UF_6

	west	East
positive (+)	.552	.558
DC (∞)	.574	.580

IC #3
+131.3sec; +7.77#

22.0 mils = 7.77# ΔP = 0.353#/mil

$k > 1$ (7.77#) @ 0.453"

k_∞ @ 0.475"

IC 3 = 1.25×10^{-8} @ ∞
4 = 1.2×10^{-9}

Alarm A .6 K
B 2.1 K
C 2.3 K

PM 635 volts = reads 30 of 50.

The radiographs were used to estimate the height of the UF_6 in each cylinder. From this rough number a density was calculated. Conclusion shows substantial differences of all cylinders. i.e. for example why #42B vs #460 shown the dates as is in EXP# 25 vs EXP# 26.

From Low ρ to High	From Low Mass to High	Cylinder Number	Flange[a] Bottom Diam (in.)		Flange[a] Top Diam (in.)		20 in. from floor @ number Diam (in.)		ρ $a_c + b_c X$
~~15~~	1	460 ✓	8.920	8.808	8.911	8.809	8.448	4.412	30.0
5	2	492	8.950	8.810	8.871	8.845	8.457	3.937	34.5
1	3	462 ✓	8.974	8.847	8.872	8.830	8.448	3.303	40.5
11	4	483 ✓	8.944	8.785	8.941	8.790	8.457	4.254	31.5
~~15~~ 16	5	494	8.961	8.754	8.921	8.817	8.432	4.465	29.5
6	6	491	8.891	8.829	8.913	8.906	8.430	4.043	33.5
2	7	485 ✓	8.976	8.782	8.859	8.867	8.394	3.303	40.5
12	8	437	8.957	8.795	8.917	8.763	8.405	4.254	31.5
13	9	499 ✓	8.981	8.798	8.908	8.806	8.427	4.149	32.5
7	10	451 ✓	8.967	8.792	8.867	8.913	8.380	4.043	33.5
8	11	475 ✓	8.965	8.838	8.862	8.870	8.441	4.043	33.5
9	12	351 ✓	8.754	8.861	8.769	8.932	8.290	4.043	33.5
~~14~~ 15	13	453 ✓	8.939	8.808	8.810	8.925	8.493	4.359	30.5
10	14	438 ✓	8.940	8.803	8.904	8.778	8.436	4.043	33.5
4	15	468 ✓	8.967	8.822	8.900	8.810	8.439	3.726	36.5
3	16	423 ✓	8.894	8.826	8.907	8.800	8.459	3.514	38.5
								3.993	34.0

Avg → 8.873 Avg 8.862

Avg 8.427 ± .011 W'TD Avg 4

G. avg → 8.868 measured ± .008 W'TD

→ 8.875 DRAWING 8.375

ANG ↑ *

* Estimated height (excluding 1½" @ bottom of cyl) of material in the cyl. as read (est.) from radiographs.

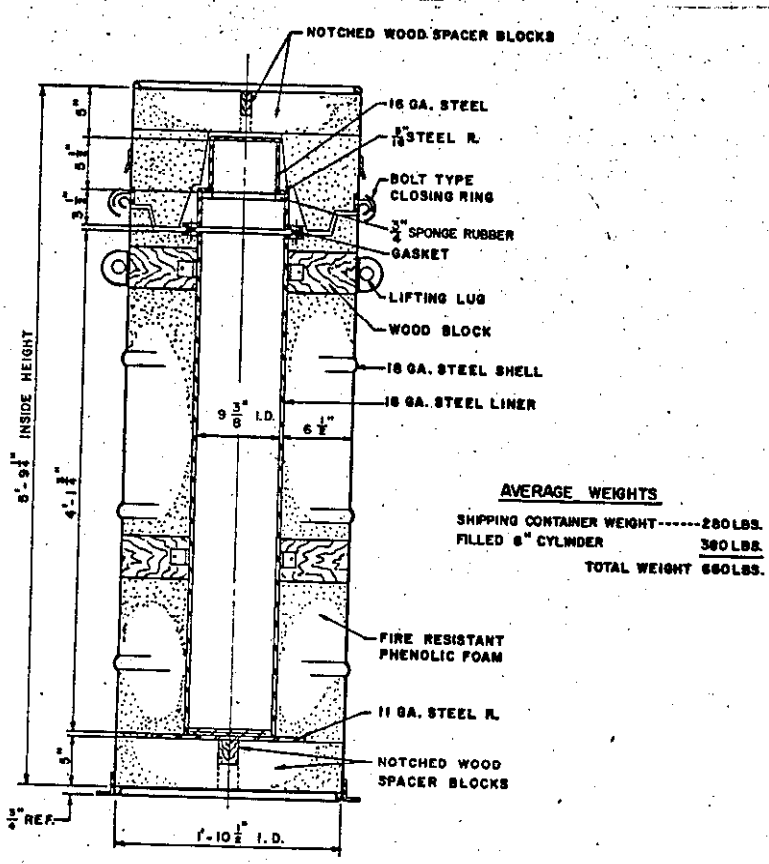
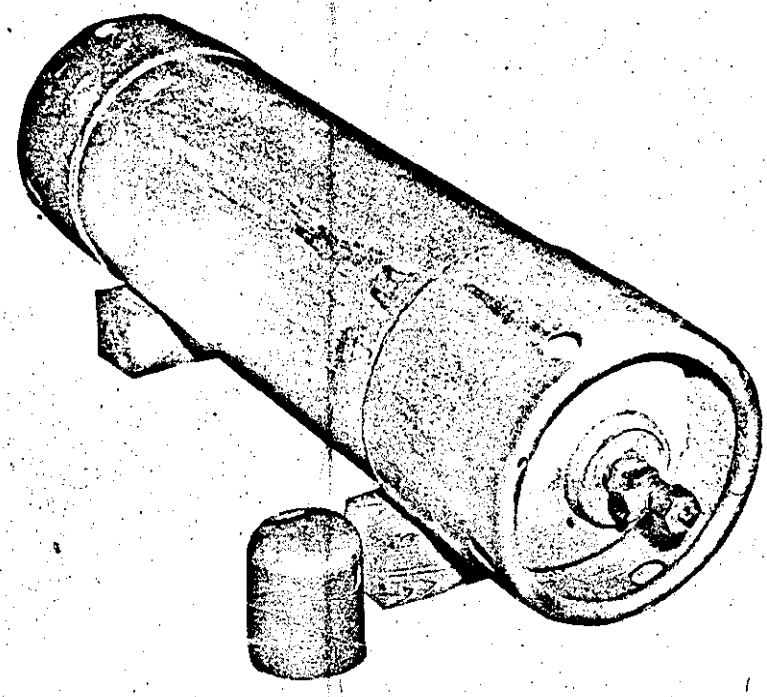


Figure 16
PROTECTIVE OUTER PACKAGE
FOR UF_6 CYLINDER MODEL 8A

UF_6 CYLINDER MODEL 12A

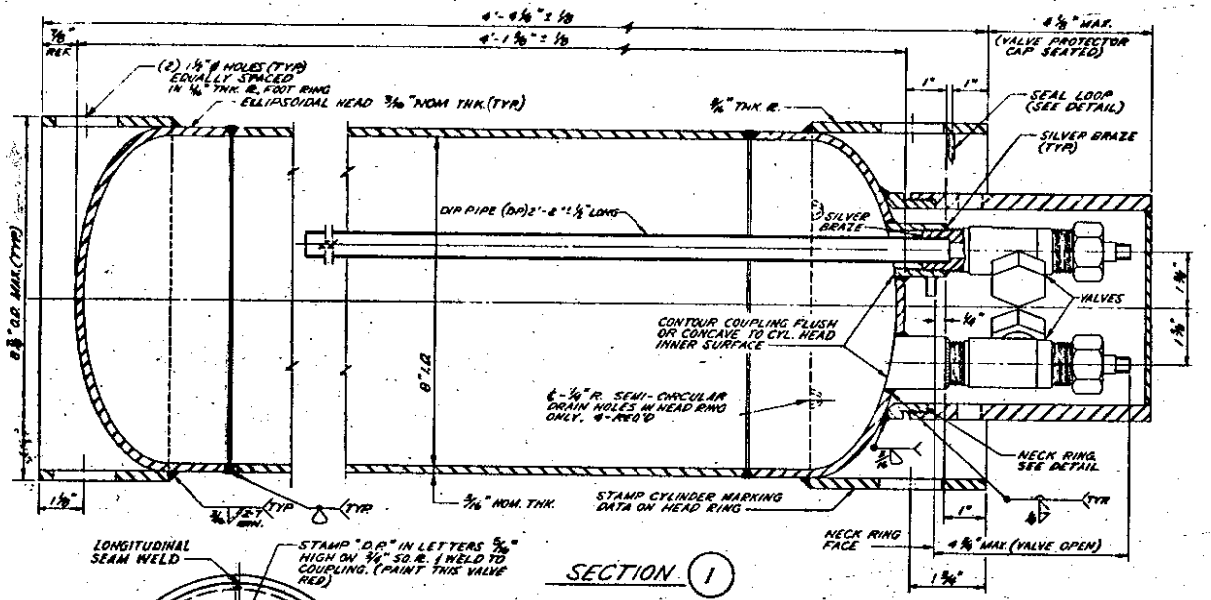


GENERAL DATA

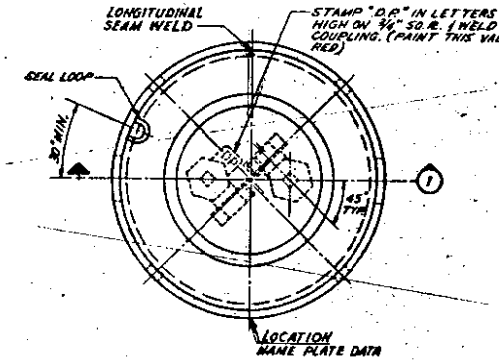
Other Descriptive Terminology Used - 12-inch, MD

ENGINEERING DRAWING REFERENCE	UNION CARBIDE CORPORATION, ORGDP: D-P 35721-C, REV. 1
Nominal Diameter	12 in.
Nominal Length	54 in.
Wall Thickness	0.200 in.
Nominal Tare Weight	185 lb
Maximum Net Weight	460 lb
Nominal Gross Weight	645 lb (without cap)
Minimum Volume	2.38 cu ft
Basic Material of Construction	Nickel
Service Pressure	200 psig
Hydrostatic Test Pressure	400 psig
Isotopic Content Limit	5.0% ^{235}U max

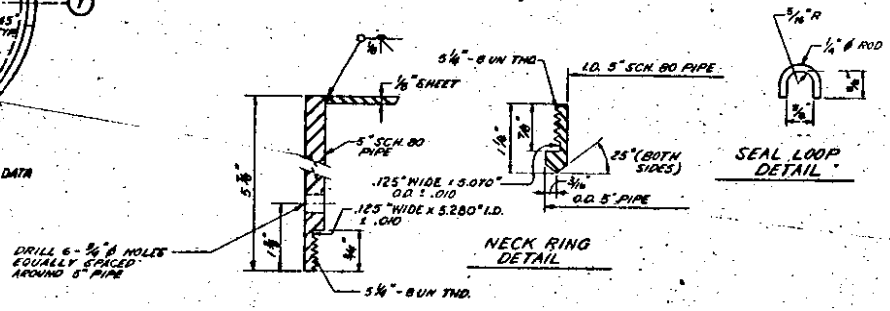
Valve Used - Superior No. 5665, or equal.



SECTION (1)



PLAN



NECK RING DETAIL

SEAL LOOP DETAIL

VALVE PROTECTOR CAP DETAIL

NOTE:
DIMENSIONAL TOLERANCE ± 1/16" UNLESS OTHERWISE SPECIFIED. ANGULAR TOLERANCE ± 1°

GENERAL NOTES

A. DESIGN CONDITIONS
1. DESIGN PRESSURE - 13 PSIG EXTERNAL AND 200 PSIG INTERNAL
2. DESIGN TEMPERATURE - 250°F
3. MINIMUM VOLUME - 1.849 CU. FT.

B. FABRICATION
1. THE CYLINDER SHALL BE FABRICATED IN ACCORDANCE WITH THE LATEST EDITION OF SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE. IT SHALL BE STAMPED WITH THE ASME CODE "U" SYMBOL AND REGISTERED WITH THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS.
2. LONGITUDINAL AND GIRTH WELDS SHALL BE SPOT RADIOGRAPHED IN ACCORDANCE WITH PARAGRAPH UW-52 OF THE ASME CODE WITH A MINIMUM OF ONE SPOT RADIOGRAPH PER WELD. QUALITY STANDARDS FOR JUDGING ACCEPTABILITY OF THE WELDS SHALL BE AS STATED IN PARAGRAPH UW-51.

C. TESTING
1. THE CYLINDER SHALL BE HYDROSTATICALLY PRESSURED TO 400 PSIG AND THEN THE PRESSURE LOWERED TO 300 PSIG WHILE THE CYLINDER IS INSPECTED FOR LEAKS. DEFECTS, IF ANY, MAY BE REPAIRED AS PERMITTED IN THE ASME CODE, FOLLOWED BY A RETEST.
2. FOLLOWING THE CLEANING OPERATION AND VALVE INSTALLATION, AN AIR TEST OF 100 PSIG SHALL BE APPLIED AND ALL CONNECTIONS AND FITTINGS (INCLUDING THE VALVE SEAT AND PACKING) SHALL BE LEAK TESTED USING CARBONA SOAPLESS LATHER OR APPROVED EQUAL. NO LEAKAGE SHALL BE PERMITTED. WHEN THE CYLINDER IS PURCHASED WITHOUT VALVES, THIS TEST SHALL BE APPLIED BY THE PURCHASER.

D. MATERIAL

1.	SHELL	- NICKEL-COPPER ALLOY PLATE ASTM B-127
2.	HEADS	- NICKEL-COPPER ALLOY, ASTM B-127 ELLIPSOIDAL, 2:1 RATIO WITH 2" STRAIGHT FLANGE
3.	FOOT AND HEAD RINGS	- NICKEL-COPPER ALLOY PLATE, ASTM B-127
4.	NECK RINGS	- NICKEL-COPPER ALLOY PIPE, SCH. 80, ASTM B-165
5.	VALVE PROTECTOR CAP	- NICKEL-COPPER ALLOY PIPE, SCH. 80, ASTM B-165 AND NICKEL-COPPER ALLOY SHEET ASTM B-127
6.	SEAL LOOP	- NICKEL-COPPER ALLOY ROD, ASTM B-164
7.	DIP PIPE	- COPPER TUBE, 5/8 INCH O.D. x 0.049 WALL THICKNESS, ASTM B-75 LIGHT ANNEALED
8.	VALVES	- SUPERIOR NO. 5965 OR APPROVED EQUAL
9.	COUPLINGS	- NICKEL-COPPER ALLOY, FORGED 3/4 INCH 3000 LB., ASTM B-164 IN ACCORDANCE WITH ANSI B16.11, EXCEPT THREADED WITH 3/4 INCH - NATIONAL GAS TAPER THREADS.
10.	BRAZING & FLUX	- FILLER METAL SHALL BE AWS SF A-5.8, CLASS 7 OR 8, WITH EUTECTOR FLUX, AUTOGENIC COMPOUND 190 OR APPROVED EQUAL.
11.	DIP PIPE TAB	- NICKEL-COPPER ALLOY, 1/4 IN. THICK, ASTM B-127.

E. VALVE INSTALLATION
VALVES SHALL BE COMPLETELY DISASSEMBLED AND CLEANED BEFORE BRAZING AND INSTALLATION. THE DIP PIPE SHALL BE SILVER BRAZED TO THE APPLICABLE VALVE. VALVE BODIES SHALL BE INSTALLED IN THE COUPLINGS WITH A THREAD ENGAGEMENT OF 7 MINIMUM AND 12 MAXIMUM. SILVER BRAZE TO COUPLINGS BEFORE REASSEMBLY OF THE VALVE.

F. CYLINDER MARKING
THE FOLLOWING DATA SHALL BE STAMPED ON THE CYLINDER HEAD RING IN CHARACTERS A MINIMUM OF 5/16 INCH HIGH.
1. ASME CODE AND NATIONAL BOARD STAMPING
2. "MODEL 8A"
3. OWNER'S NAME OR IDENTIFICATION SYMBOL AND SERIAL NUMBER (NOT EXCEEDING FOUR DIGITS)
4. "TARE WT. _____ LB"
5. "WATER CAP. _____ LB" (WATER CAPACITY AT 60°F CERTIFIED BY THE MANUFACTURER)
6. "MAX. NET WT. PURE UF_6 235 LB"
7. DATE OF MANUFACTURE

G. CLEANING
AFTER WELDING AND HYDROSTATIC TESTING ARE COMPLETED, THE INSIDE OF THE CYLINDER SHALL BE THOROUGHLY CLEANED OF ALL GREASE, SCALE, SLAG, OXIDES, DIRT, AND OTHER FOREIGN MATTER. SURFACES SHALL BE LEFT CLEAN, BRIGHT AND FREE OF ALL CONTAMINATION. WHEN THE CYLINDERS ARE PURCHASED WITHOUT VALVES, THE OPENINGS SHALL BE SEALED TO PREVENT CONTAMINATION OF INTERIOR DURING SHIPMENT.

ORGDP DWG. NO. D-P35721 B R1

UF_6 CYLINDER MODEL 8A

FROM: ORO-651 Rev. 3

Instrument Check on DEC. 7 1973 Source ^{60}Co #20

Taylor & Cross

SM-1 875 Low Trip OK Trip OK

IC-1 3×10^{-10} Motor Trip OK Fast Trip OK

IC-2 3×10^{-10} Motor Trip OK (SCRAM) Bldg. Alarm

IC-3 10^{-9} Calibration OK A ok

IC-4 10^{-9} Calibration OK B ok

BF$_3$ #1 BF$_3$ #2 C OK

Area Cleared Run 113 Neg press.

Exp # 28 4 x 4 (less one cylinder) t = 19.4°C

Super (11) Spacing = 3/4"

k>1 (19.89¢) @ .030"

	West	East	IC #3
Positive (+)	.130	.131	+37.17 sec; +19.89¢
∞	.223	.225	

Table gap @ ∞ = 124 mils

NOTE: TOPS were @ "closed" and bottom was not. ∴ + to ∞ is not literally accurate.

k=∞ @ .124"

Δρ = 0.218¢/mil or closure would have been ≃ +26¢ (est.)

483	475	494
468	437	351	460
492	438	453	491
462	495	439	451

~~24.535~~ cm ℄ to ℄ Use

WTD 24.504 cm JRT

Exp # 29 (11) Add #423 to blank above = full 4 x 4 array — no other changes.

Super

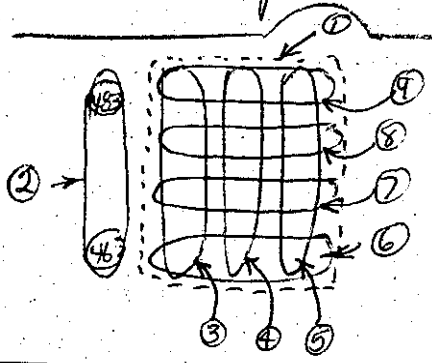
	West	East	IC #3
Positive (+)	1.642	1.648	+83.45 sec; +11.35¢
∞	1.711	1.717	

k>1 (11.35¢) @ 1.544"

k=∞ @ 1.614"

from + to ∞ = 69 mils = +11.35¢ or 0.164 ¢/mil

Table gap @ ∞ = 1614 mils



PERIMETER MEASUREMENTS

1	312.2 cm	24.50 cm ℄ to ℄ Spacing
2	214.6	24.54
3	214.5	24.54
4	214.5	24.54
5	214.6	24.56 → AVG = ~~24.535 cm~~
6	165.4	24.54 Use
7	165.5	24.57
8	165.4	24.54 WTD = 24.504 cm JRT
9	165.2	24.49

Taylor & Lynn

Instrument Check on DEC 10 1979 Source 60 C #20

PM-1 875 V Low Trip SCRAM OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm A OK

IC-3 10^{-9} Calibration OK B OK

IC-4 10^{-9} Calibration OK C OK

Area Cleared Rm 112 = Neg Pres.

EXP #30 (12) Same 4x4 array but with actual spacer #894 mils between all plaques.

	West	East	IC #3
Positive (+)	.555	.561	+52.1 sec ; +15.56 ¢
-k>1 (15.56¢) @ 0.457"			

1x4 perimeter = 216.3 cm = 24.85 ¢ x(6 wtd) = WTD

3x4 " = 315.4 cm = 24.82 ¢ x(10 wtd) = AVG 24.821 ¢/¢

EXP #31 (13) Add 20 mils additional to above spacers. actual Spacers = 0.918"

	West	East	IC #3
Positive (+)	.387	.394	+83.6 sec ; +10.98 ¢
DC (∞)	.443	.451	

-k>1 (10.98¢) @ 0.290"

k ∞ @ 0.346

1x4 perimeter 216.8 = 24.93 cm

3x4 perimeter 316.3 = 24.91 cm

WTD avg 24.910 ¢/¢

56.5 mils = 10.98¢ or .178¢/mil

DEC 11 1973

Instrument Check on _____ Source 60 Co #20

HV 875 V Low Trip OK Trip SCRAM

IC-1 3X10⁻¹⁰ Motor Trip OK Fast Trip _____

IC-2 3X10⁻¹⁰ Motor Trip OK

IC-3 10⁴ Calibration OK

IC-4 10⁹ Calibration OK

Area Cleared

Relay Alarm A ✓
B ✓
C ✓

Rm 113 = Neg pres

EXP #32 (14) Actual Spacers = 946 mils between flanges

1 x 4 perimeter	217.1 cm	24.978	wts avg
3 x 4 perimeter	316.8 cm	24.957	24.960 ± to ¢

IC #3

	West	East	
Positive (+)	.103	.107	(closed) .105
To (∞)	.234	.240	.237
Negative (−)	.268	.275	.272

+ 22.80 sec ; + 25.96 ¢

∞

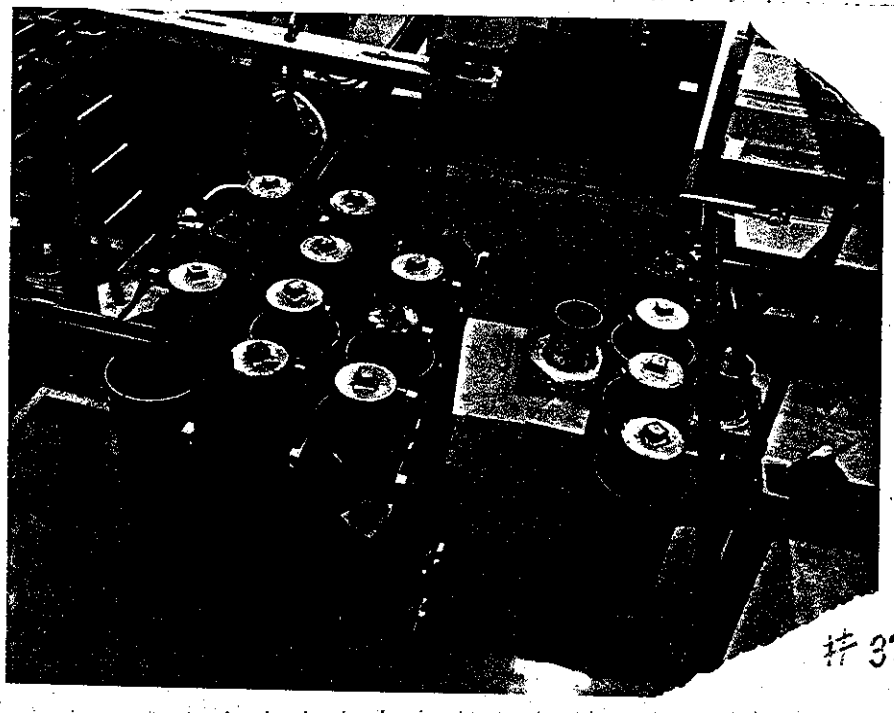
−232.3 sec ; − 6.64 ¢

from + to ∞ = 132 mils = 25.96 ¢ → 0.197 ¢/mil

from ∞ to − = 34.5 mils = 6.64 ¢ → 0.192 ¢/mil

k∞ @ .132

k2 16.64 @ 0.167"



#32

Taylor & Lynn

Instrument Check on DEC 12 1973 Source ^{60}Co #70

FM-1 875 Low Trip o/c : Trip o/c

FM-2 :

IC-1 3×10^{-10} Meter Trip SCRAM o/c Fast Trip o/c

IC-2 3×10^{-10} Meter Trip o/c Bldg Alarm A o/c

IC-3 10^{-9} Calibration o/c B o/c

IC-4 10^{-9} Calibration o/c C o/c

Rm #113 - neg pres. Area Cleared

Evaluate 1/4" steel

Exp #33 (15) add 1/4" of steel to top of table (i.e. under the cylinders). Table is one inch ∴ 1 1/4" thickness. 1/4" size = 72" wide x 36" long on each table.

Conf. as near identical to Exp #32 as possible.

	West	East	IC #3
Positive (+)	.436	.444 .440	+31.85 sec ; + 21.37 ¢
Do (∞)	.547	.557 .552	
Neg (−)	.599	.609 .604	−1.71 sec ; − 9.91 ¢

from + to ∞ = 112 mils 0.191 ¢/mil

from ∞ to − = 52 mils 0.191 ¢/mil

1 x 4 perimeter = 21 x 7.1

3 x 4 perimeter = 31 6.8 → WTD avg = 24.960 cm ¢ to ¢

→ from ∞ Exp 32 (.237) to ∞ Exp 33 (.547) = 0.315"

315 mils x 0.191 ¢/mil = 60.2 ¢ value of 1/4" steel

k > 1 (21.37 ¢) @ 0.337"

k ∞ @ 0.449"

k < 1 (9.91 ¢) @ 0.501"

Instrument Check on DEC. 13 1973 Source ^{60}Co #20 Taylor & Lynn

PM-1 875 Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip SCRAM-OK

IC-2 3×10^{-10} Meter Calib OK Bldg Alarm A OK

IC-3 10^{-9} Calibration OK B OK

IC-4 10^{-9} Calibration OK C OK

Rm #113 neg pres. Area Cleared

Same ℄'s & ℄ meas. as Exp #33

Exp #34 (16) Remove the 1/4" steel (ref Exp #33)

	West	East		IC #3
Positive (+)	.101	.105	103	+ 32.21 sec ; +21.22 ℄
Neg (-)	~~.128~~	.236	273	- 206.3 sec ; - 7.71 ℄
	.269	.277		

from + to ∞ = 129 mils 0.164 ℄/mil

from ∞ to − = 41 mils 0.188 ℄/mil

Summary Exp #32 - 33 - 34

Grand Avg ℄/mil = .187 2 (of table separation)

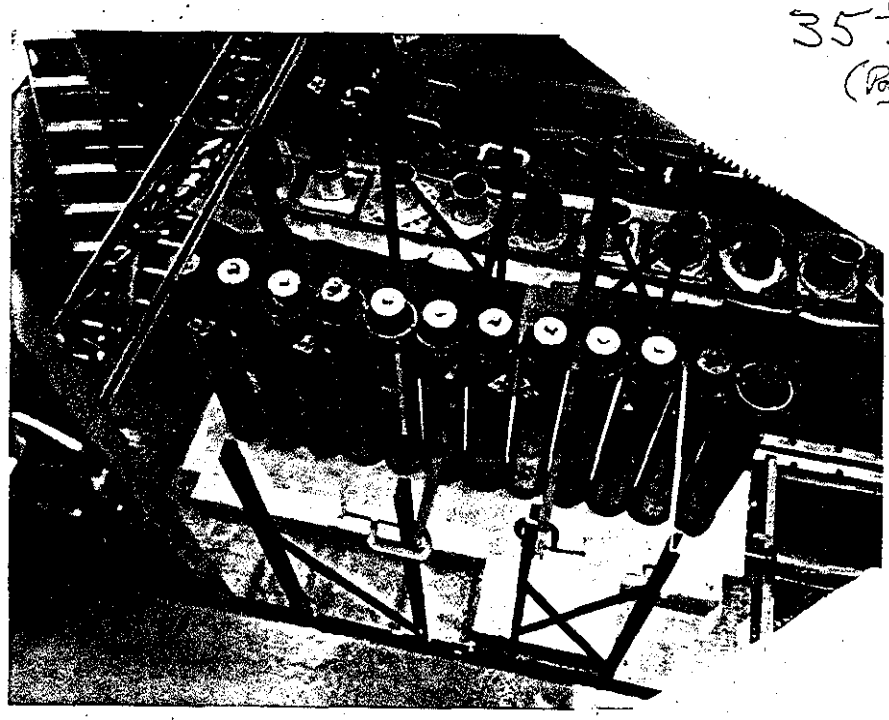
Avg. value of 1/4 plate in mils = 317.5

∴ Calc worth of 1/4 plate = +59.4 ℄

#34 [ℛ ∞ @ 0.129"]

[ℛ ≥ 1 (7.7 ℄) @ 0.170"]

35F
(Pg 35)



BOTTOM ONLY (LINEAR)

Instrument Check on DEC. 14 1973 Source ^{60}Co #20 Taylor & Cross

FM-I 875 V Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK (SCRAM) Bldg Alarm A OK

IC-3 10^{-9} Calibration OK B OK

IC-4 10^{-9} Calibration OK C OK

Area Neg Area Cleared

Exp #35a (2 cyl) Sub

Begin linear "close pack" with bottom reflector only — 6 6/4" thick poly.
Run one cylinder on each table with an extra stack of poly on the side of cylinder #468 (30" high x 6" x 1/2")

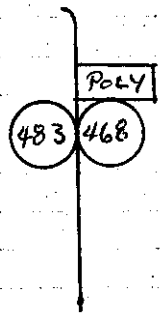
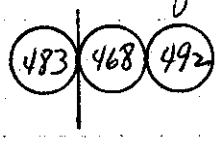


table closed — Sub

West	East
.100	.101

Exp #35b Sub — 3 cylinders (Bottom reflected only i e no side poly)



closed → Sub

BF_3 #1 = 2185 cpm table closed

#2 = 757

#1 = 2331 Separated 5'

#2 = 837

Exp #35c add #475 north of #483 = 4 cylinders

Sub closed BF_3 #1 = 2063 cpm; BF_3 #2 = 801 cpm

Exp #35d 6 cylinders 438-475-483 | 468-492-351

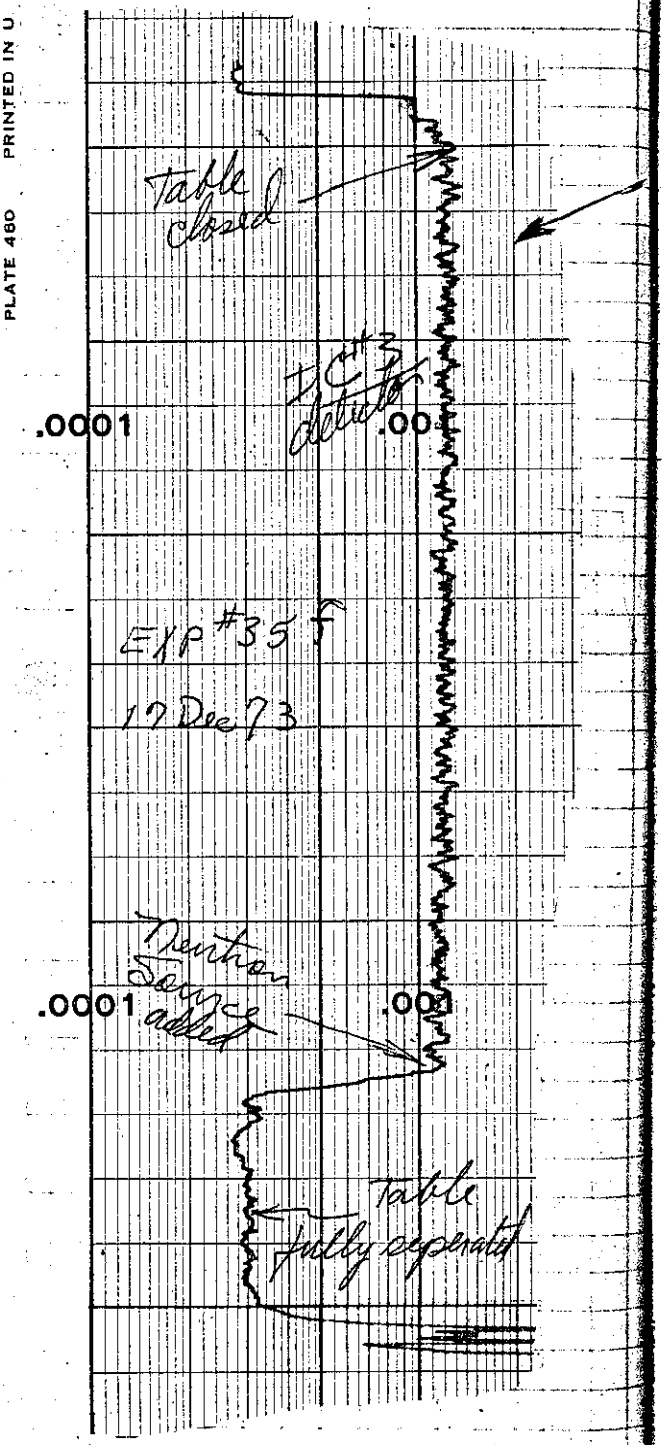
Sub closed BF_3 #1 = 2077 cpm BF_3 #2 = 777

34

Exp# 35 E — 10 cylinders

423 - 491 - 438 - 475 - 483 | 468 - 492 - 351 - 437 - 451

Sub: BF_3 #1 = 1975 cpm; BF_3 #2 = 674 ← table closed.
2048 1251 ← Separated



TAYLOR & LYNN

Instrument Check on DEC. 17 1973 Source Co^{60} #20

PM-I 875 V Low Trip SCRAM OK Trip OK

IC-1 3×10^{-10} Motor Trip OK Fast Trip OK

IC-2 3×10^{-10} Motor Trip OK Bldg alarm AOK

IC-3 10^{-9} Calibration OK BOK

IC-4 10^{-9} Calibration OK COK

~~Area Rm #13~~ Area Cleared

Temp Rm 11B = 18.5C

EXP # 35f add 2 cylinders (439 & 460) Total = 12 cylinders

423 - 494 - 438 - 475 - 483 | 468 - 492 - 351 - 437 - 451 - 439 - 460

Sub table closed west .102 east .100 No multiplication.

South permitter meas = 339.2 cm

North " " = 248.2 cm

WTd Avg E to E = 22.645 cm

USE = 22.525

See picture pg 32a

BOTTOM & 1 SIDE (LINEAR)

EXP # 36a Begin linear "close pack" with bottom and one side reflected with 6" + of poly. (bottom side & east side)

2 cyl Sub 483 (NORTH Table) | 468 (SOUTH TABLE)

table closed = Sub

EXP # 36b

4 cyl 475 - 483 | 468 - 492

Sub

BF_3 #1 5545 CPM

#2 1912 CPM

Table closed: Sub

EXP # 36c 438 - 475 - 483 | 468 - 492 - 351

6 cyl

sub

BF_3 #1: 5620 CPM

#2 = 1558 CPM

Table closed = sub

TAYLOR & LYNN

Instrument Check on DEC 18 1973 Source 60#20

BF_3 #1 & #2 = OK

PM-1 875 V Low Trip OK Trip SCRAM OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg alarm

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

R#113 = Neg Res - t = 18.1°C Area Cleared C OK

EXP# 36d 9 cylinders 438-475-483 | 468-492-351-437-451-439

Sub Table closed BF_3 #1 = 5816 ; #2 = 1418

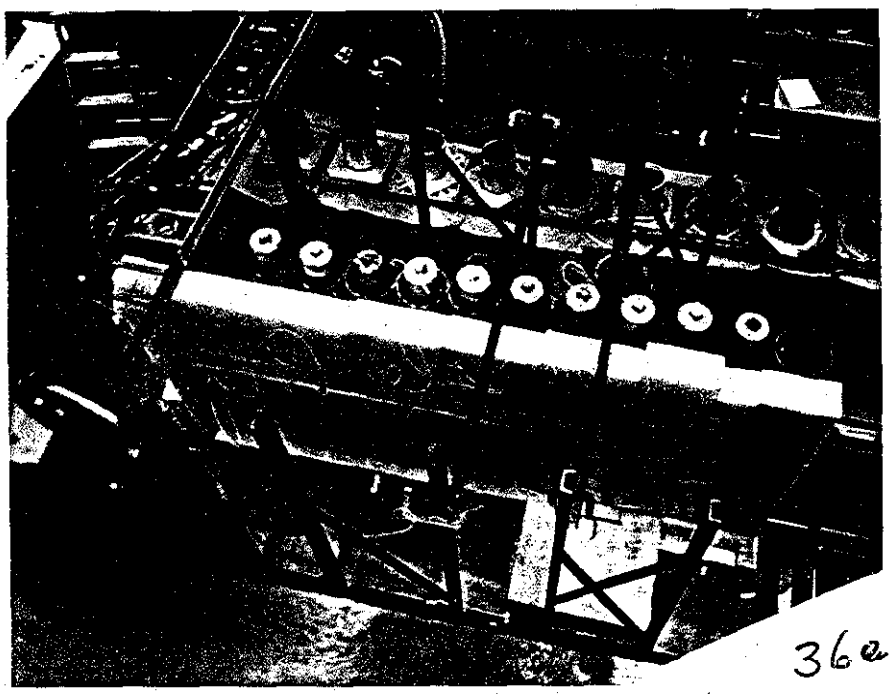
EXP# 36e 13 cylinders

North | South

Sub 423 494 438-475-483 | 468-492-351-437-451-439-491-460

table closed BF_3 #1 = 5763 ; #2 = 1172 525

Same E to E as pg 35 (EXP# 35F) 22.645 cm



36a

BOTTOM + 2 SIDES (LINEAR)

Exp # 37a

sub

Begin linear "close pack" with 6" or more of poly on bottom and 2 sides (east + west).

2 cylinders 483 | 468 closed table W: 101 E 100
BF3 #1 = 4705; #2 = 1674 CPM

Exp # 37b

sub

4 cylinders 475 - 483 | 468 - 492 BF3 #1 = 5400 cpm
#2 = 1200

Exp # 37c

sub

7 cylinders: 438 - 475 - 483 | 468 - 492 - 351 - 437

table closed = "Dead."

38

Taylor & Lynn

Instrument Check DEC 19 1973 Source ^{60}Co #20

PM-1 875 V Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip SCRAM OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm A OK

IC-3 10^{-9} Calibration OK B OK

IC-4 10^{-9} Calibration OK C OK

Run #113 = Neg Press.; 18.2°C Area Cleared

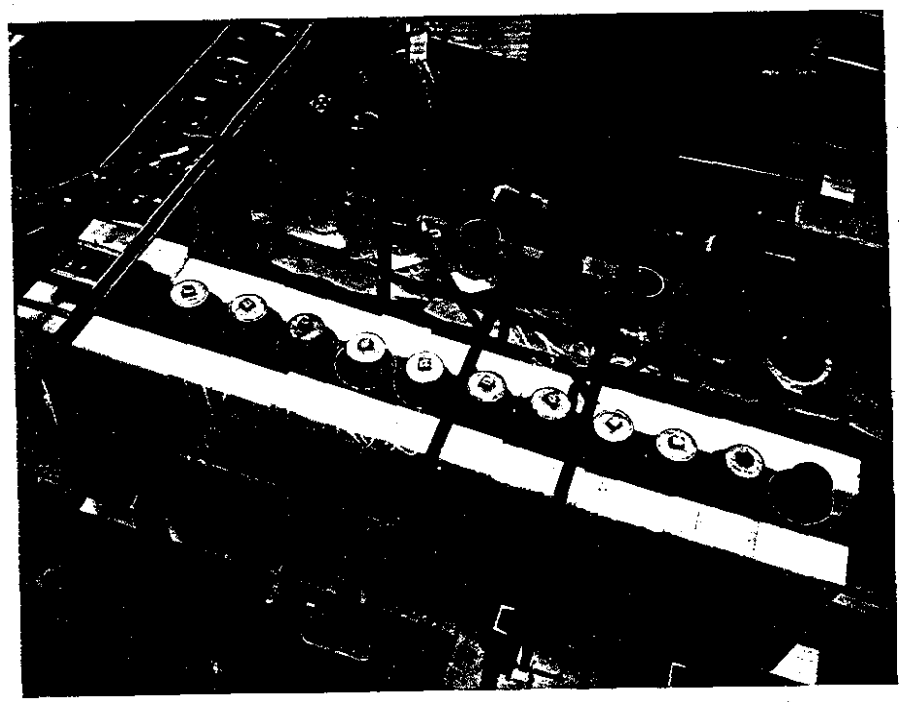
37d 423 - 494 - 438 - 475 - 483 | 468 - 492 - 351 - 437 - 451 - 439

Sub 11 cylinders table closed - Sub → "Dead"

37e 13 cylinders table closed - Sub → "Dead"

Sub 423 - 494 - 438 - 475 - 483 | 468 - 492 - 351 - 437 - 451 - 460 - 491 - 439

t to t same = 22.~~345~~ 32.5 cm



37e

5 SIDES (2×2)

TAYLOR & LYNN

Instrument Check of DEC 20 1973 Source ^{60}Co #20

PM-1 875 V Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip SCRAM OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarms

IC-3 10^{-9} Calibration OK OK A

IC-4 10^{-9} Calibration OK OK B

Rm #113 = Neg. Press. t = 19.6°C Area Cleared OK C

38a 2×2 array (close pack) Poly reflected on 5 sides (i.e. bottom & 4 sides). (17)

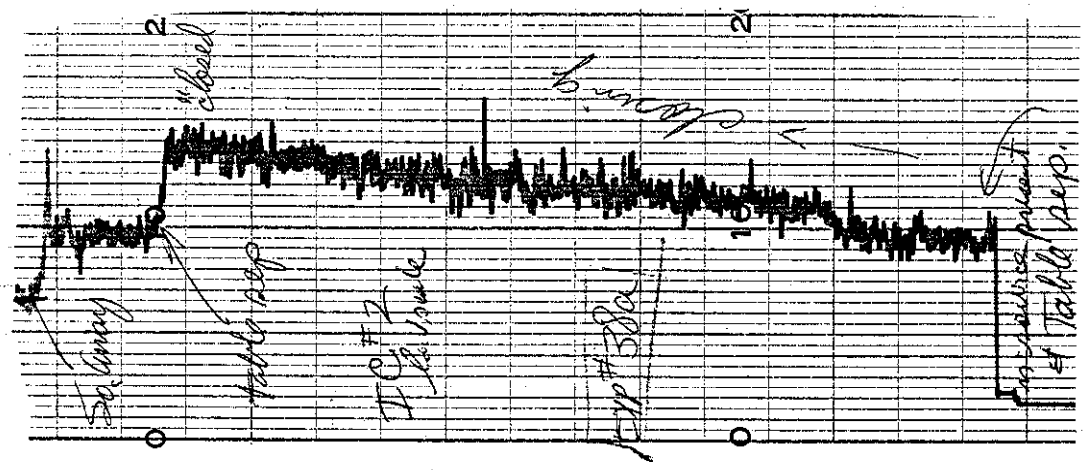
Soil

483	475
492	468

← North

Table lacks 40 mils being closed but there is "no" multiplication other than rm as table approaches.

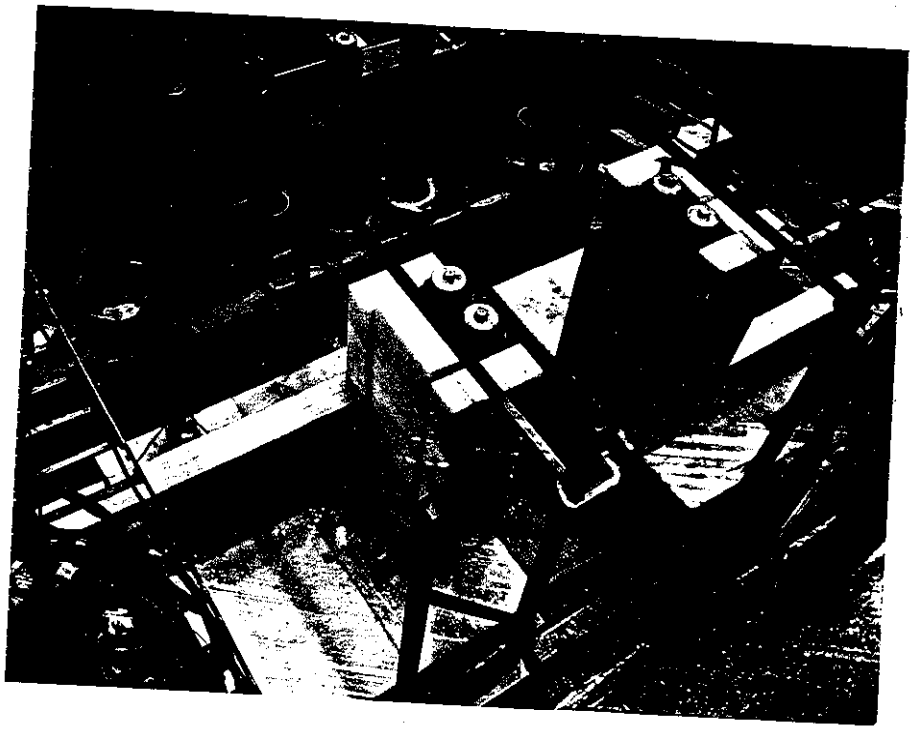
39



38b 2×2 array (same as above except added 0.450" (1/2") Lucite ~~rods~~ cylinders east-west between.

Soil

Table closed → Multiplication Nil
IC2 increased only ≈ 20% (ref 38a)



38a

Instrument Check on JAN 7 1974 Source ^{60}Co #20

PM-1 ×75 V Low Trip OK Taylor & Lynn Trip OK

PM-2

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK

IC-3 10^{-9} Calibration OK Bldg Alarm

IC-4 10^{-9} Calibration OK A ✓

Run #113 = Neg. Pass. $t = 18.3°C$ Area Cleared B ✓ C ✓

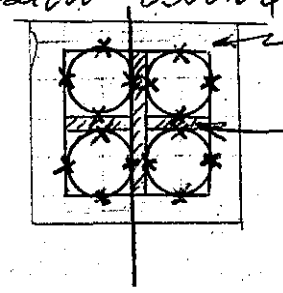
38c Sub (18) 2×2 array with (1/2") Circle EW & NS between cylinders. = 0.450"

Table (closed light) IC#2 increased from 10 to 20. Slightly more mult. than run #38b, but still quite sub.

38d Same but with ~0.950" between cylinders.

Super

Positive Period @ West 538 East 537



6" or more of polygon 5 sides (~~Not Equilateral~~).

≃ 0.980" see next pg.

IC#3 → 37.48 sec ; +19.33 ϕ

x = contact points

SCRAM @ 13^{35}/hrs due to PM voltage being too high. IC#3 read 1.0 @ trip.

42

38c (19) Repeat 38d — IC #3

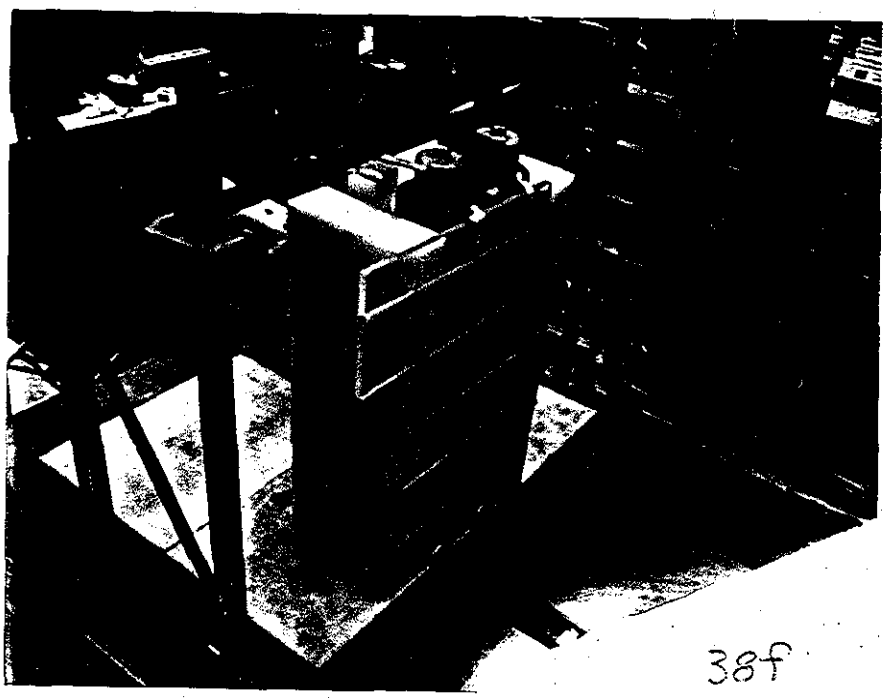
	digital		
Positive (+)	.538	.537	+37.64 sec; +19.27 ¢
Negative (−)	.585	.585	
	.606	.606	−187.8 sec; − 8.72 ¢

IC 3 ¢/mil =

@ ℄ of 2 cylinders after 20 min shutdown
Critical = 1.8 R/hr.

moderator thickness measured avg EW = 1.010"
Avg NS = 0.9700
Grand avg = 0.990"

℄ to ℄ cylinders = 25.052 cm



38f

38e $k > 1$ (19.27¢) @ 0.435"

k_∞ @ 0.482"

$k < 1$ (8.72¢) @ 0.503"

Instrument Check on JAN 8 1974 Source 60 Co #20

Taylor & Lyon

FM-1 875 V Low Trip ok Scram Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK

IC-3 10^{-8} Calibration OK

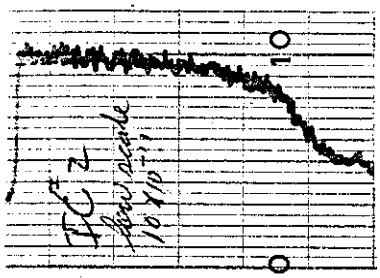
IC-4 10^{-8} Calibration OK

Bldg Chan A B C

Run #113 - Neg Pres t = 18.3°C

Area Cleared

385 (20) 2 x 2



Sub

Make 1/8" spacing @ all "contact" points. i.e. separate the cylinder from all component - moderator or reflector by 1/8".

See X's pg 41 for spacing

table closed digits 10 (west) & 10 (east) positions

Sub-Critical - Slight indication on instruments.

Measured Moderator thickness (Plexiglass) EW = 0.961"

NS = 0.970

Grand Avg = 0.966

Avg. ℄ to ℄ cylinders = 25.613 cm

Avg Inside of Poly "Box" = 48.773 cm

Avg Moderator thickness = 2.454 cm

Thickness of reflector = 15.24 cm or more

38g (21)

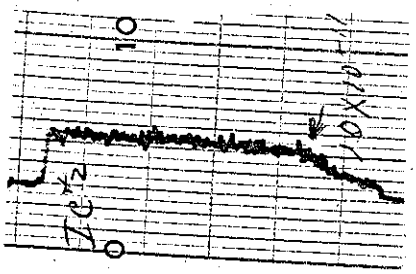
Sub

Add 1/4" plexiglass to moderator t-18.5°C

Avg mod. thickness = 3.09 cm

℄ to ℄ = 26.248 cm

More sub-than 38f



Instrument Check on JAN 9 1974 Source Co^{60} #20

Taylor & Lynn

PM-1 875 V Low Trip o/c Trip o/c SCRAM

IC-1 3×10^{-10} Meter Trip OK Fast Trip o/c

IC-2 3×10^{-10} Meter Trip o/c Bldg Alarm A ✓

IC-3 10^{9} Calibration o/c B ✓

IC-4 10^{9} Calibration o/c C ✓

Rm #113 = Mfg. Price. t = 18.0°C Area Cleared

38h 2 x 2 Back to Plexiglass moderator = 0.966"
Super (22) But make spacing = 1/16"

	West	East	IC #3	IC #4
Positive (+)	.277	.277	+40.90 sec; +8.28°	+39.80; +19.23
DC (∞)	.333	.334		
Neg (−)	.351	.353	-251.9 sec; -6.02°	-252.6; -6.00°

From Positive to DC = 56.5 mils @ 18.76° = 0.332°/mil
From DC to Neg = 18.5 mils @ 6.01° = 0.325°/mil } 0.3285°/mil

Closure = 0.101
DC = 0.3335
0.2325 mils @ 0.3285°/mil = 76.38° more to go to closure

k to k = ~~30.15~~ cm

38h k>1 (18.76°) @ 0.175"
k-∞ @ 0.232"
k<1 (6.01°) @ 0.250"

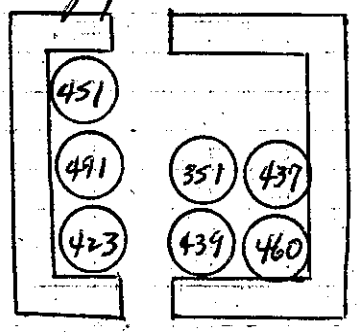
check 25.137 o/c

Instrument Check on JAN 10 1974 Source ^{60}Co #20
Taylor & Lynn

PM-1 JAN 10 1974 Low Trip 875 V O/C Trip O/C

IC-1 3×10^{-10} Motor Trip SCRAM OK Fast Trip O/C
IC-2 3×10^{-10} Motor Trip O/C Bldg Alarm A ✓
IC-3 10^{-9} Calibration O/C B ✓
IC-4 10^{-9} Calibration O/C C ✓
Ran 113 mg pairs $t = 18.3°C$ Area Cleared

39a Sub.



[3 X 3] less 2
1/2" → 0.499" spacing between cylinders
1/4" spacing between Pb & cyl.
5 sides reflected!
℄ to ℄ = 23.566 cm
Table jack .385" being closed due to top alignment. Top was together.

39b (23) Same but add cyl. #475 to S-E corner of box.
Sup'n ∴ [3 X 3] less 1 @ center-east.

	West	East	IC#3
Positive (+)	.262	.264	+70.57 sec ; +12.56$^{\phi}$
DC (∞)	.320	.322	

∴ 58 mils = 12.56$^{\phi}$ or 0.217 $^{\phi}$/mil

220 mils to closure from DC = ≃ 48$^{\phi}$

k > 1 (12.56$^{\phi}$) @ 0.161"
k ∞ @ 0.220"

Instrument Check on JAN 11 1974 Source 60 Co #20

PM-1 875 V Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip SCRAM OK

IC-3 10^{9} Calibration OK

IC-4 10^{9} Calibration OK

Ref #113 Deg Press. t 18.4°C

Taylor & Lapp

Eldy Chem A ✓

B ✓

C ✓

Area Cleaned

39c (24) 3 x 3 array

[Σ D @ 4.3 inches separation of table]

#483 was added to remaining position

Spacers = 650 mils btwn. cyl. flange

Spacers = 325 mils btwn cyl & Poly

Poly = 5 side – 6" or more

E to E = 24.176 cm

39d (25) Same but new spacing = 915 mils cyl-cyl

= 453 mils cyl-poly

Inside Ref dim = 29.35 inches

E to E = 24.849 cm

[D @ ≈ 2.8 inches separation]

451	483	475
491	351	437
423	439	460

k > 1 (24.454) @ .019" ←

k ∞ @ 0.150"

k < 1 (8.947) @ 0.195"

Instrument Check JAN 14 1974 Source 60C #20 Taylor & Lynn

PM-1 875 V Low Trip Set'm OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm

IC-3 10^{-9} Calibration OK A ✓

IC-4 10^{-9} Calibration OK B ✓

Res #113 = Dayton Temp t=17.9°C C ✓

Area Cleared

39e 3x3 array Avg Spacing = 1466 mils btwn cyl.
" = 733 mils btwn cyl & Poly.
Poly = 5 sides 6" or more.
t to t = 26.247 cm
Inside "Box" = 78.74 cm

Pulled off @ 70 mils from closure. Had only a slight multiplication indication.

39f Made slight adjustment of Poly alignment. at closed → still only slight multi.

39g 3x3 array New Spacing = 1,405 mils btwn cyl.
0.700 mils cyl → Poly
t to t = 26.094 cm
Slight alignment problem @ 70 mils from closure had a small positive period of >10⁴

39h (26) Make alignment adjustment and repeat 39g.

	West	East	IC#3
+	.115*	.125 (.120)	+25.33 sec.; + 24.45⁴
∞	.246	.255 (.250.5)	∞
−	.291	.300 (.295.5)	−184.57 sec. − 8.94⁴

from (∞) to (−) : 45 mils = 8.94⁴ or .199⁴/mil

* Note: a small alignment offset at this position. Closed = .101

Instrument Check on JAN 15 1974 Source 60 Cyl #20

Taylor-Lynn

PS-1 875 V Low Trip OIC Trip SCRAM (OK)

IC-1 3×10^{-10} Meter Trip OIC Pant Trip OIC

IC-2 3×10^{-10} Meter Trip OIC Bldg Alarm A ✓

IC-3 10^{-9} Calibration OIC B ✓

IC-4 10^{-9} Calibration OIC C ✓

Run #113 = Neg Press, t = 18.3°C Area Cleared

39i Repeat Run # 39h for K-25 personnel.

	West	East	Ic # 3
Positive	.109	.123	+34.32 sec + 20.41 ft
DC	.220	.229	

Ic>1 (20.41 ft) @ 0.015"

Ic_{oo} @ 0.124"

109 mils = 20.41 ft = .187 ft/mil

Dimensions same as 39g Pg 47

Cylinder Pos. #5 39d Pg 46

Paid paper for 39i

Instrument Check on JAN 15 1974 Source 60 Cy #20

Taylor-Lynn SCRAM (OK)

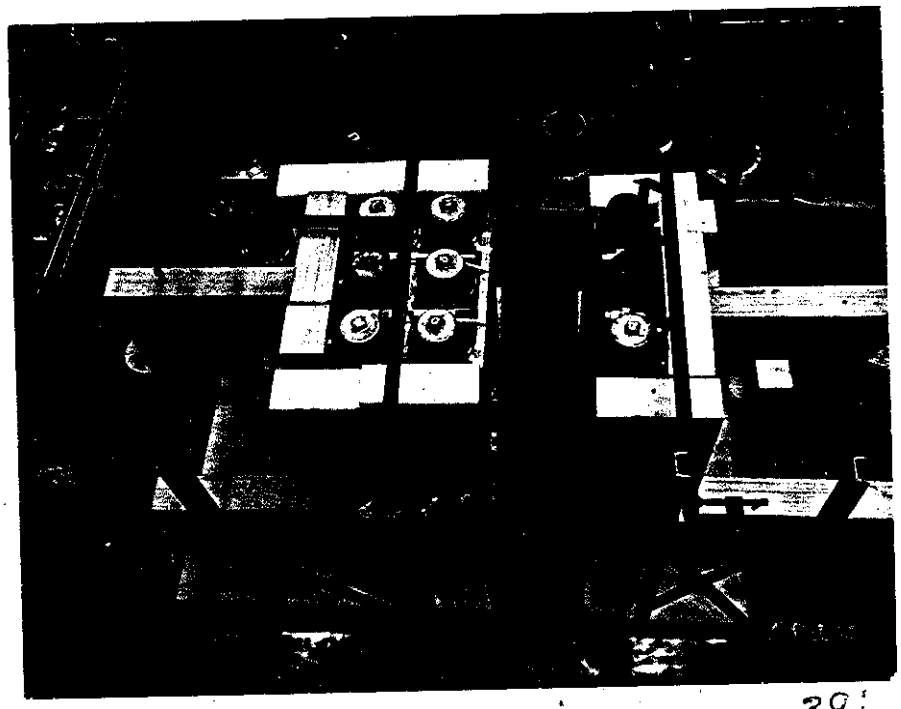
PM-1	875 V	Low Trip	O/C	Trip	
IC-1	3×10^{-10}	Meter Trip	O/C	Past Trip	O/C
IC-2	3×10^{-10}	Meter Trip	O/C		Bldg Cleared A ✓
IC-3	10^{-9}	Calibration	O/C		B ✓
IC-4	10^{-9}	Calibration	O/C		C ✓
	Run #113 = Neg Press,		$t = 18.3°C$		Area Cleared

39i Repeat Run # 39h for K-25 personnel.

	West	East	IC # 3
Positive	.109	.123	+34.32 sec ≈ 20.41#
DC	.220	.229	109 mrad = 20.41# = .187 #/mrad

K>1 (20.41#) @ 0.015"
K∞ @ 0.124"

Dimensions same as 39g Pg 47
Cylinder Pos. #5 39d Pg 46



39i

4X4 ARRAY

5 SIDES POLY REFL. i.e. top "open" 49

Taylor & Lynn

Instrument Check on JAN 16 1974 Source ^{60}Co # 20

[illegible]	875 V	Low Trip	OK	Trip	OK
[illegible]					
IC-1	$3X10^{-10}$	Meter Trip	SCRAM OK	Fast Trip	OK
IC-2	$3X10^{-10}$	Meter Trip	OK		
IC-3	10^{-9}	Calibration	OK		
IC-4	10^{-9}	Calibration	OK		
[illegible]	Bm # 113 =		t = 19.6°C		

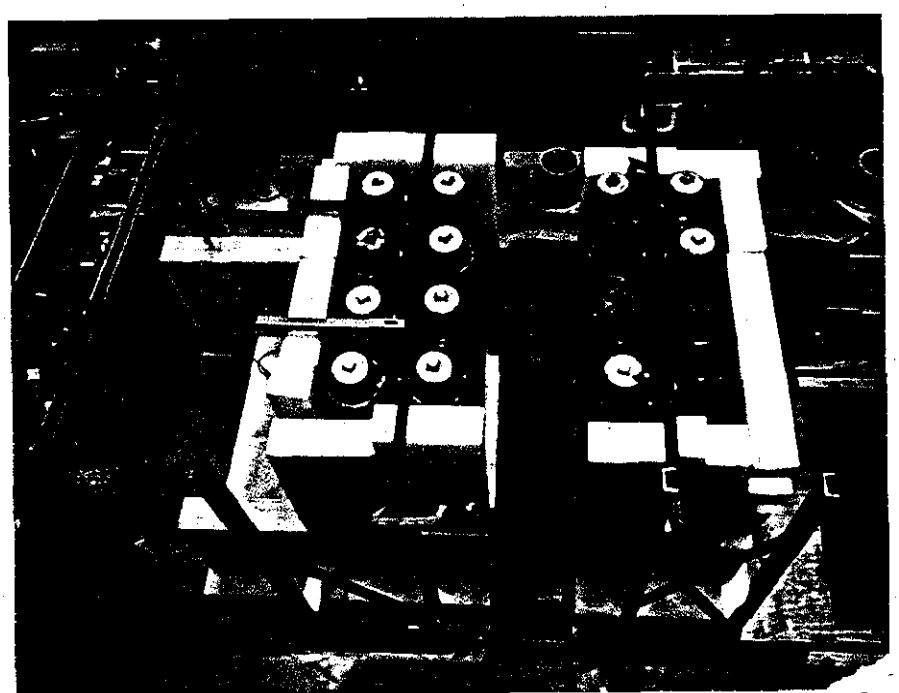
BLD6 Alarm
A OK
B OK
C OK
Area Cleared

40a 4X4 Array

Sat

462	451	468	492
485	491	483	475
438	423	351	437
453	494	439	460

3125 mils spacing cyl-cyl.
1560 mils spacing cyl-Poly
℄ to ℄ cyl = 30.46cm
Inside Box = 121.85cm



40a

50

Top = ½ reflector

Taylor & Flynn

Instrument Check on JAN 17 1974 Source ^{60}Co #20

PM-1 875V	Low Trip OK	Trip OK	
IC-1 3×10^{-10}	Meter Trip OK	Post Trip SCRAM OK	Bldg. Alarm
IC-2 3×10^{-10}	Meter Trip OK		A OK
IC-3 109	Calibration OK		B OK
IC-4 109	Calibration OK		C OK

Room #113 - Deg Rise t = 19.2°C Area Cleared

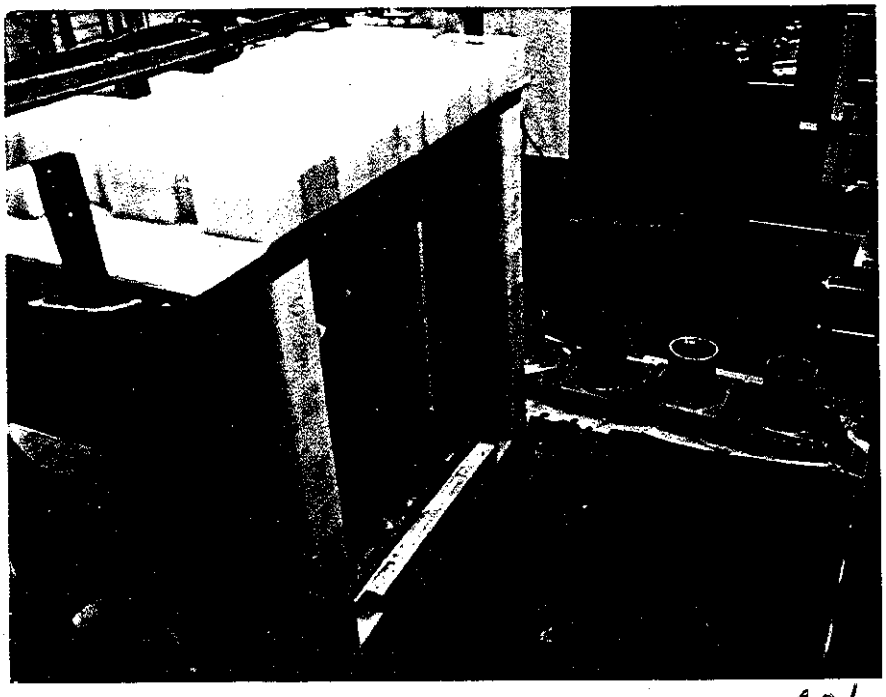
140b 4 X 9 Same spacing but add

Sat

Full top reflector to stationary table only.

Inside Box (vertical) : 5 7/16" or 146.6 cm

West = .114 East = .126 @ "closure" — Sat.



40b

Instrument Check on JAN 18 1974 Source ^{60}Co #20 TAYLOR & LYNN

IC-1 875 VOLTS Low Trip OK Trip OK

IC-2 3×10^{-10} Meter Trip OK Fast Trip OK

IC-3 10^{9} Calibration OK BLDG A KERN

IC-4 10^{9} Calibration OK A OK B OK C OK — Area Cleared

Rad #113 Neg Pres. $t = 18.9°C$

40c 4 X 4 (27) Super

5 SIDES REFLECTED WITH 6" OF MORE POLY.

SPACING = 2.625" cyl – cyl
1.3125 cyl – Poly
ℓ to ℓ = 29.192 cm

	West	East	AVG	IC #4
Positive Period	.100	.1098	.1043	+21.71 sec; +26.66¢ table closed.
DC (∞)	.273	.285	.279	∞
Negative (–)	.308	.320	.314	−299.7 sec; − 4.90¢

+ to ∞ = 174.5 mils = 26.66¢ = 0.153¢/mil
∞ to − = 35.0 mils = 4.90¢ = 0.140¢/mil

$k > 1$ (26.66¢) @ 0.0"
$k \infty$ @ 0.175"
$k < 1$ (4.90¢) @ 0.210"

40d Evaluate effect of removing 10" of reflector from sides (all vertical sides) of the movable table only i.e. 40d vs 40c

Super

	West	East	AVG	
Pos. (+)	.100	.108	.104 (closed)	+480.5 sec; +2.47¢
DC (∞)	.114	.125	.1195	∞
Neg (–)	.150	.161	.1555	−234.5 sec; −6.56¢

NT of poly from base of cylinder to top of poly = 41 3/4"
i.e. on movable table only.

+ to ∞ = 15.5 mils = 2.47¢ = 0.159¢/mil
∞ to − = 36.4 mils = 6.56¢ = 0.180¢/mil

$k > 1$ @ 0.0" (2.47¢)
$k \infty$ @ 0.091"
$k < 1$ (6.56¢) @ 0.052"

∴ 10" Poly (cf above) = 26.66¢ less 2.47¢ = 24.19¢

Grand Avg ¢/mil 40c & 40d = 0.158¢/mil

52

40e (28) Evaluate effect of adding complete top reflector to stationary table only

i.e. 40e vs 40d Inside vestide

box = 57 3/4" t = 19.5°C

	West	East	Avg	IC*3	
Positive (+)	.268	.276	.272	+89.57rec ;	+10.51¢
DC	.335	.344	.3395		

67.5 mils = 10.51¢ = 0.156¢/mil

TOP reflector stationary table = 34.76¢

k > 1 (+3.51¢) @ 0.168"
k ∞ @ 0.236"

Instrument Check on JAN 2 3 1974 Source ^{60}Co #20

Taylor & Cross

PM-1 875 V Low Trip SCRAM OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK BLDG ALARM

IC-3 10^{-9} Calibration OK A ✓

IC-4 10^{-9} Calibration OK B ✓

Run #113 = Neg. Press. t=19.1°C C ✓

Area Cleared

40f (29) Sub

4 x 4 array Poly reflected Full 6 sides with 6" or more.

Spacing "Flange" = 2.782" (7.066cm) cyl to cyl

Spacing = 1.391" (3.533cm) cyl to Poly [5 sides]

Inside Box "vertical" = 57.875" avg (147.00cm) Poly to Poly

Inside Box "Horizontal" = 46.60" avg (118.36cm) Poly to Poly

"Substantial" mult. but could not get tables together due to slight refl. alignment W=.143; E=.149

40g Sub

Same but make slight Poly adjustment of alignment

W = 119 E = 127

40h

Same but add moderator (one piece plexiglass symmetrically placed on each table equal in size.

Placed horizontally (North & South) at center with bottom edge of moderator 3/16" above the bottom edge of the cylinders.

Super

k_{eff} @ ≈ 0.515"

Moderator on each table = .970" x 8" x 16"

Super @ digitron = 620 or ≈ 80¢ from closure

40i

Replace mod (ref 40h) with = .730" x 6" x 16"

Super @ digitron = 400 or ≈ 45¢ from closure

Super

k_{eff} @ ≈ 0.295"

40j Replace mod (ref 40i) with .230" x 6" x 16"

Eqpt: Approaching Critical @ 1530 hrs.

	West	East	avg	IC #3
Positive (+)	.116	.122	.119	+101.55 sec; +9.64 ϕ
DC (∞)	.188	.194	.191	

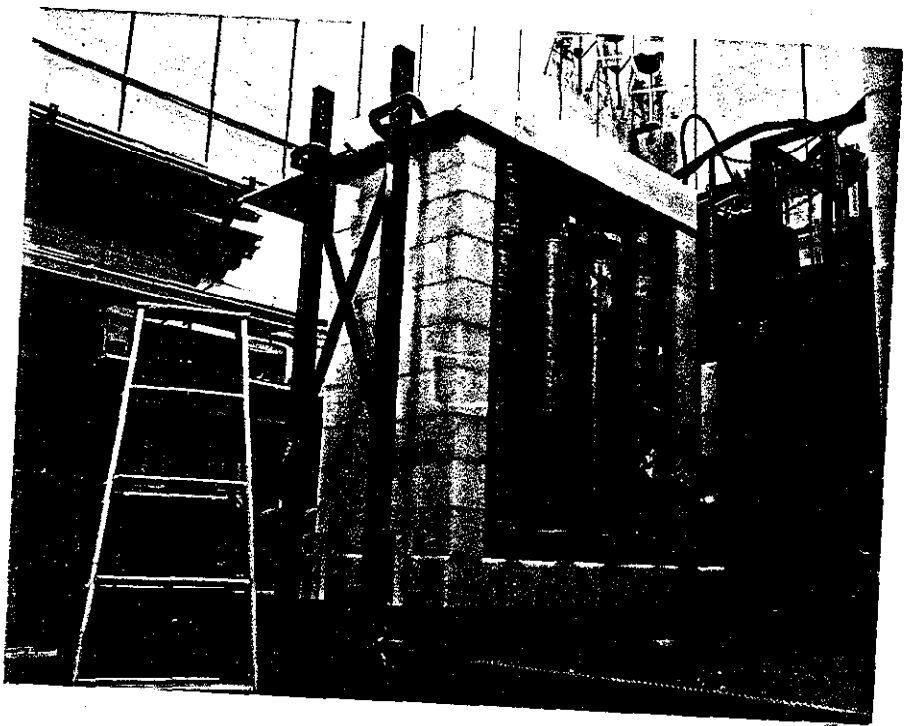
(+) to (∞) = 72 mils = 9.64 ϕ = 0.134 ϕ/mil

$k > 1$ (9.64 ϕ) @ 0.014"
k_∞ @ 0.086"

40k Add to 40j one piece on South only .122" x 6" x 16"

	West	East	avg	IC #3
Positive (+)	.113	.117	.115	+22.50 sec; +26.15 ϕ
DC (+)	.188	.194	.191	+180.54 sec; +5.96 ϕ

$k > 1$ (26.15 ϕ) @ 0.010"
k_∞ @ 0.086"



40 f

Instrument Check on JAN 24 1974 Source ^{60}Co #20 Taylor & Cross

FM-1 875 V Low Trip OK Trip Scram OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm

IC-3 10^{-4} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Run #113 = Desplaces, t = 19.2°C C OK

Area Cleared

40l Remove all moderator (ref 40k)
Add to each side 1 piece .230" x 16" x 16"
& 2 pieces .055" x 5" x 10"

	West	East	avg	IC #3
Positive (+)	.112	.118	.115	+4792 sec; +16.47^{q}
DC (∞)	.225	.232	.229	∞

(+) to (∞) = 114 mils = 16.47^{q} = 0.144 ^{q}/mil

k>1 (16.47^{q}) @ 0.010"
k∞ @ 0.124"

40m Remove all mod. from North table only (ref 40l).

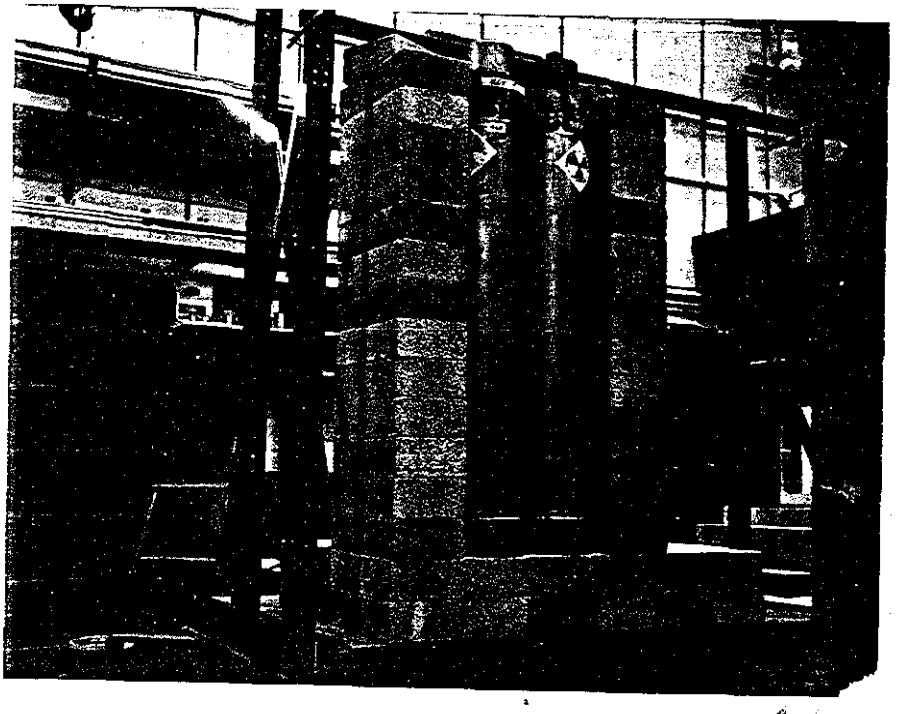
	West	East	avg	IC #3
Positive (+)	.112	.118	.115	+514 sec; +2.32^{q}
DC (∞)	.132	.138	.135	∞

(+) to ∞ = 20 mils = 2.32^{q} = .116 ^{q}/mil

k>1 (2.32) @ 0.010"
k∞ @ 0.030"

∴ 2.32^{q} + (10 mils to closure = 1.30^{q}) − 14.15^{q} = −10.53^{q}

t of fuel of one table @ 2½ min. after shut down = 2 R/hr
Preceding shut-down was a positive period of 16.47^{q} up to a log N (IC3) of 6.0 - then level for 3 minutes.



4 / 8

2 x 2 CONCRETE REFL.

Instrument Check on JAN 30 1974 Source ^{60}Co #20 Taylor & Lynn

PM-1 875 V Low Trip OK Trip OK

PM-2 "

IC-1 3×10^{-10} Meter Trip SCRAM OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg

IC-3 10^{9} Calibration OK Albuna A OK

IC-4 10^{9} Calibration OK B OK

Ran #113 - Neg Press. t = 19.4 °C C OK

Area Cleared.

41a (30) 2 x 2 close pack (0" separation) 8" concrete (5 sides) (NO TOP)

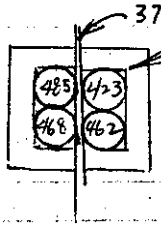
	West	East		IC #3
Positive	433	440	476.5	+44.88 sec ; +17.21#
∞	473	481	477	∞

+ to ∞ = 40.5 mils : 17.21# = 0.425#/mil

closure = .100 on digiten ∴ 377.0 mil x .425 = ≈ 160#

ℓ ≠ ℓ = 22.525 cm

Spacing = Zero



Avg est ℓ = 3.462

Avg Ufet = 39", or 99.06 cm

ℓ_1 > 1 (17.21#) @ 0.336"

ℓ_∞ @ 0.376"

41b (605 cm) 2 x 2 with .238" (.605 cm) separation between cyl & cyl, cyl & Concrete

.125" (.318 cm)

ℓ ≠ ℓ = 23.129 cm

Some multiplication @ 50 mils from closure. Make alignment.

Instrument Check on JAN 31 1974 Test 60 Co #20 Source Taylor & Lyman

PC-1 875 v Low Trip OK Trip OK

IC-1 $3X10^{-10}$ Meter Trip OK Fast Trip SCRAM OK
IC-2 $3X10^{-10}$ Meter Trip OK Bldg Alarms
IC-3 10^{9} Calibration OK A OK
IC-4 10^{9} Calibration OK B OK
Run #113 = Neg Pers.; t = 19.2°C; Area Cleared C OK

41c (31) Same but 30 mils from closure & about same multiplication

41d add plexiglass (1 each same size) to each table symetrically. = .375" x 7 1/8" x 7 3/8".

	West	East		IC #3
Pos (+)	.101	.103	.102	closed table
Ø (∞)	.115	.120	.117.5	245.38 sec; 4.56 #

+ to ∞ = 15.5 mils = 4.56 # = 0.294 #/mil k ∞ @ 0.016"

41e Replace 41d plexi with 1.475" x 12" x 6" with thick edge flush against rear concrete and resting on its edge of bottom flange.

	West	East		IC #3
Pos (+)	.180	.182	≈	≈ +8.85 sec; = 42 #

k > 1 (= 42 #) @ 0.019"

41f Replace 41e plexi with [.240" x 12" x 6" / .120 x 8" x 6"] on each table

	West	East		IC #3
Pos (+)	.101	.101	.101	71.66 sec; = 12.41 #
	.138	.141	.139.5	k ∞ @ 0.039"

+ to ∞ = 38.5 mils = 12.41 # = 0.322 #/mil

41g Remove the plexi from North table @ closure = Sub-Crit with mult. IC3 = .13

41h Use plexi. on each side = 0.355" x 12" x 6" symmetrically.

	West	East		IC #3	IC #4
Positive (+)	.100	.101	.1005	22.33 sec; 26.25#	21.24 sec; 26.98#
DC (∞)	.174	.176	.175		

k∞ @ 0.075"

+ to ∞ = 74.5 mils = 26.62# = 0.357#/mil

41i Remove all plexi. from North table.

Sub

41j Add back 0.240" x 12" x 6" to North table.

	West	East		IC #3	IC #4	
Positive (+)	.100	.101	.1005	188.9 sec = 5.72#	184.3 sec; 5.98#	Avg = 5.85#
DC ∞	.119	.122	.1205	k∞ @ 0.020"		

+ to ∞ = 20 mil = 0.299#/mil separation value

115 mils one side = 20.77# 0.181#/mil plexi value

∴ calc "plex-per mil basis" the 2 x 2 is ≈ 98# negative

41h vs 41j calc = -101.89# value of conf "clear"

40k Use plexi on both sides = 0.475" x 12" x 6"

	West	East		IC #3	IC #4
Positive Period (+)	.182	.183	.1825	13.46 sec; 34.84#	11.38 sec; 32.65#
DC (∞)	.271	.273	.272		

+ to ∞ = 90.5 mil = 36.25# = 0.401#/mil

wt. avg. from curve

to closure: 172 (.371) = 63.81#

k>1 (36.25#) @ 0.081"

k∞ @ 0.172"

40l Remove all plexi. from one (W) side

table closed → sub @ IC #3 = 0.05

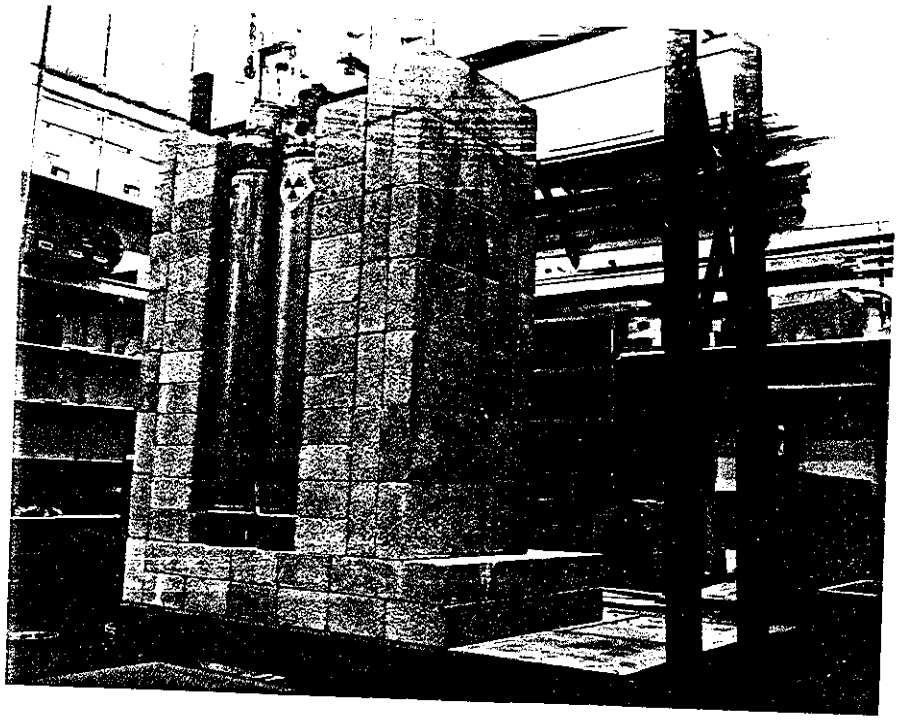
40m Add 0.2375" x 12" x 6" to North

	West	East		IC #3	IC #4
positive (+)	.100	.102	.101	29.04 sec; 23.12#	26.48 sec 24.40#
DC (∞)	.164	.167	.1655		

k∞ @ 0.065"

64.5 mils = 23.76# or ~~23.76#~~ 96.39 0.368#/mil

41k vs 41m calc = -97.35# Avg: J&M = -99.62#



41p

Instrument Check on FEB 1 1974 Source 60Co #20 Taylor & Lynn

PM-1 875 V Low Trip O/C Trip O/K

IC-1 3×10^{-10} Meter Trip O/C Fast Trip O/C

IC-2 3×10^{-10} Meter Trip SCRAM O/C Bldg alarm

IC-3 109 Calibration O/C A OK

IC-4 109 Calibration O/C B OK

Room #113 - Neg Press; T = 18.6°C; area clear C OK

41m 2 x 2 same as 41m (but the plexi) but add 4" concrete on 4 sides on each = .2375" x 12" x 6"

∴ Bottom = 8" & 4 sides = 12" concrete

		West	East	IC # 3	IC # 4
Positive	(+)	.829	.831 .830	+25.19 sec; 24.54#	24.43 sec; 24.96#
DC	(∞)	.893	.895 .894	∞	

(+) to (∞) = 64 mils = Avg + 24.75# = .387#/mil

est from (∞ to closure) = ≈ .34 (79#) = 27#

k = 1 (24.75#) @ 0.725"

k ∞ @ 0.759"

41o 32 Same but remove the 2 pieces of plex, (ref 41m)

		West	East	IC # 3	IC # 4
Positive	(+)	.682	.684 .683	8.39#; 119.25 sec	
DC	∞	.702	.706 .704	∞	

+ to ∞ = 21 mils = 8.39# = 0.400#/mil

est from (∞ to closure) = ≈ .34 (60#) = 20#

Value of 2 (.240" x 12" x 6") = est 6#

Value of .2375" x 12" x 6" each 41m vs 41o = 32.5#

Value of adding 4" of concrete to 4 sides 41m vs 41o = 30#

k = 1 (8.39#) @ 0.578"

k ∞ @ 0.599"

Instrument Check on FEB 4 1974 Source 60C#20

Taylor & Lynn

EB-1 875 VOLTS Low Trip SCRAM OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarms

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Rm #113 = Neg. Press; t = °C; area clear C OK

41q (34) Add ↑ 41p a ~~full~~ 8" top. Bottom of top concrete is 58" from top of bottom concrete.

	West	East		IC #3	IC #4	
Pos (+)	.835	.839	.837	+28.77 sec; 22.71#	+30.67 sec; 21.86#	Avg +22.29#
DC (∞)	.893	.895	.894			

Post DC = 57 mils = 22.29# or 0.391#/mil

k > 1 (22.29#) @ 0.732"
k ∞ @ 0.789"

Value of adding Top 8" = +22.29#

41r (35) Remove 4" from 3 sides. i.e. Back to 41o + 8" top. Ref 41o

	West	East		IC #3	IC #4	
Pos (+)	.702	.706	.704	33.83 sec; 19.88#	36.37 sec; 19.69#	Avg +19.79#
DC (∞)	.753	.758	.756			

+ to ∞ = 51.5 mils = 19.79# = 0.384#/mil

41o vs 41r Value 8" top = 19.79#

k > 1 (19.79#) @ 0.599"
k ∞ @ 0.651"

64

41p (33)

2x2 same spacing & cyl.

Bottom = 8" concrete
West side = 12"
South & East sides = 16"
T.O.P = OPEN

	West	East		IC #3	IC #4
Pos (+)	.777	.779	.778	29.04 sec ; 22.60 ¢	28.95 sec ; 22.63 ¢
∞ Pos	.834	.838	.836		

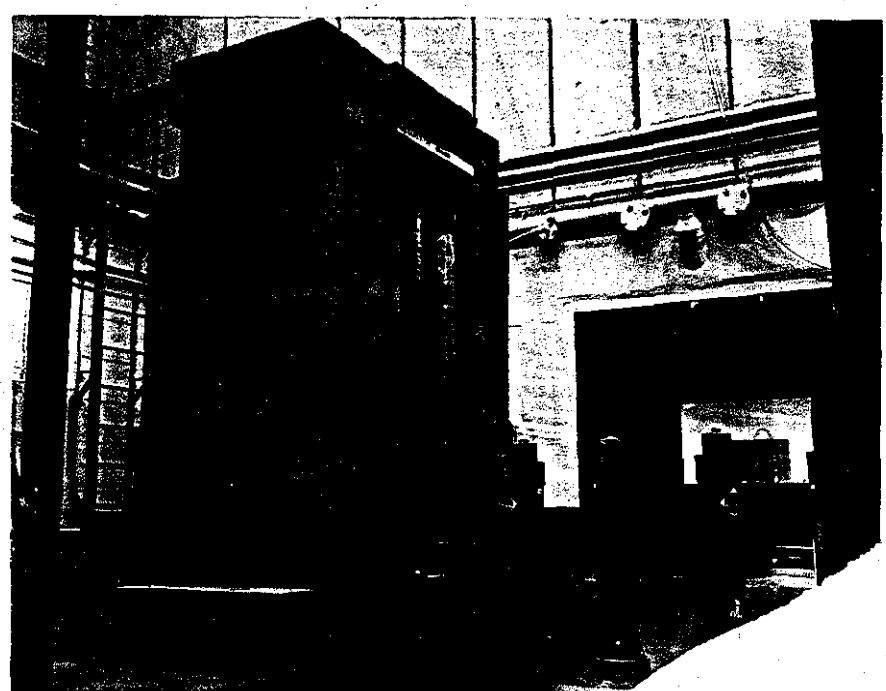
+ to ∞ = 58 mils = 22.62 ¢ = 0.390 ¢/mil

41o vs 41p = 132 mils (+) vs (∞) x .34 = 44.88 ¢

k_1 > 1 (22.62 ¢) @ 0.573"
k_∞ @ 0.731"

i.e. 4" added to 3 sides = 44.88 ¢

Had some concrete which came from West End smeared as OC.



41g

Instrument Check on FEB 4 1974 Source 60 C 20

Taylor & Lipsett

EM-1 875 VOLTS Low Trip SCRAM OK Trip OK

IC-1 3×10^{-10} Motor Trip OK Fast Trip OK

IC-2 3×10^{-10} Motor Trip OK Bldg Alarms

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Run #013 = Neg. River ; t = °C ; Area Cleared C OK

41q (34) Add to 41p a full 8" top. Bottom of top concrete is 58" from top of bottom concrete.

	West	East	IC #3	IC #4	Avg
Pos (+)	.835	.839 .837	+28.77 sec; 22.71$^{\phi}$	+30.67 sec; 21.86$^{\phi}$	+22.29$^{\phi}$
DC (∞)	.893	.895 .894			

Pos to DC = 57 mils = 22.29$^{\phi}$ or 0.391$^{\phi}$/mil

.71 (22.29$^{\phi}$) @ 0.732"
k_{∞} @ 0.789"

Value of adding Top 8" = +22.29$^{\phi}$

41R (35) Remove 4" from 3 sides. i.e. Back to 41Q + 8" top. [ref 41o]

	West	East	IC #3	IC #4	Avg
Pos (+)	.702	.706 .704	33.83 sec; 19.88$^{\phi}$	36.37 sec; 19.69$^{\phi}$	+19.79$^{\phi}$
DC (∞)	.753	.758 .755			

+ to ∞ = 51.5 mils = 19.79$^{\phi}$ = 0.384$^{\phi}$/mil

41o vs 41R Value 8" top = 19.79$^{\phi}$

$k_{>1}$ (19.79$^{\phi}$) @ 0.599"
k_{∞} @ 0.651"

Instrument Check on FEB 5 1974 Source 60 C# 30 Taylor & Lynn

FM-1 875 V Low Trip OK Trip SCRM OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-4} Calibration OK B OK

Run #113 = Neg. Pwr.; t = 19.3°C Area Cleared C OK

41 S 2 x 2 6 sides refl with 8" concrete

add 2 pieces [each .2375" x 12" x 6"] to each table

	West	East	IC #3	IC #4
R_2 (+)	.256	.260, .258	+47.05 sec; 16.67¢	+46.69 sec; 16.55¢
∞	.244	.300, .297		

∞ to (+) = 39 mils = +16.72¢ = 0.429¢/mil

197 x (.374) = 73.68¢ (WP A 16.9¢/mil from curve)

$k > 1$ (16.72¢) @ 0.153"
k_∞ @ 0.192"

41 T Remove 1 piece (.2375") from ~~South~~ table.

	West	East	IC #3	IC #4
Pos (+)	.158	.163, .160	+44.5 sec; 17.29¢	45.24 sec; 17.11¢
∞	.202	.208, .205		
Neg (-)	~~.238~~	.244, .241	-123.77 sec; +16.54¢	-125.95; -16.01¢

(+) to (∞) = 44.5 mils = +17.20¢ = 0.387¢/mil

(∞) to (-) = 36.0 mils = -16.28 = 0.~~445~~/mil .452 ↑

@ clouse = 34.27¢

Value of 1 piece (S) = 34.41¢

∴ 73.68 - 145.86 (ref Pg 67) = -72.18¢

$k > 1$ (17.20¢) @ 0.056"
k_∞ @ 0.100"
$k < 1$ (16.25¢) @ 0.136

Instrument Check on FEB 6 1974 Source ^{60}Co #20 Taylac & Lynn 67

PM-1 875 V Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip Scram O/C Fast Trip O/C

IC-2 3×10^{-10} Meter Trip OK Bldg Alarms

IC-3 10^{-9} Calibration O/C A O/C

IC-4 10^{-9} Calibration OK B OK

Rm #113 = Neg Room; t = 19.2°C Area Cleared O O/C

41u Repeat 41s

	West	East		IC #3		IC #4		
Pos (+)	.255	.261	.258	+84.6 sec,	10.96 q	86.8 sec,	10.76 q	Avg=10.86 q
DC (∞)	.282	.288	.285					
Neg (−)	.299	.305	.302	−22.8 sec	−6.80 q		Same	

+ to ∞ = 28 mils = +10.86 q 0.388 q/mil

∞ to − = 16 mils = −6.80 q 0.425 q/mil

@ clean = 69.56

k>1 (10.86 q) @ 0.153"
k∞ @ 0.181"
k<1 (6.80 q) @ 0.197"

41v Remove 1 piece (.2375") from North table

	West	East		IC #3		IC #4		
Pos (+)	.158	.163	160.5	125.9 sec,	8.04 q	122.15 sec,	8.23 q	Avg=8.14 q
DC (∞)	.180	.186	.183					
Neg (−)	.205	.211	.208	−173.72 sec,	−9.69 q		Same	

Pos to DC = 22.5 mils = 8.14 q = 0.362 q/mil

DC to Neg = 25 mils = −9.69 q = 0.388 q/mil

k>1 (8.14 q) @ 0.056"
k∞ @ 0.078"
k<1 (9.69 q) @ 0.103"

@ clean = 31.04 q

Value of 1 piece (N) = 38.52 q

∴ 69.56 − [2(38.52)] − [2(34.41)]

= −76.30 "clean"

Avg (41T & 41V) = −74.2 q

TOP Value → 41 mrs $\frac{(41V \text{ \& } 41T)}{2}$ = 25.38 q

68 H.P. Survey

FEB 7 1974

Instrument Check on _____ Source 60 Co #20

Taylor & Lynn

PM-1 875 V Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip SCRAM OK

IC-2 3×10^{-10} Meter Trip OK Alarm

IC-3 10^{-9} Calibration OK A

IC-4 10^{-9} Calibration OK B

Run #113 = neg Pass; t = 19.2°C Area Clear C

41 W

Jones, Wentchel & Rutherford made a survey of this 4'x4' 6 sides reflected & with one side open etc. in order to be able to establish the "working time" for stacking this complete configuration on one table. Wentchel estimated one hr and 15 minutes assuming one man did all the stacking and under the "worst" condition. This limitation can be improved immensly by using more people and stacking optimumly.

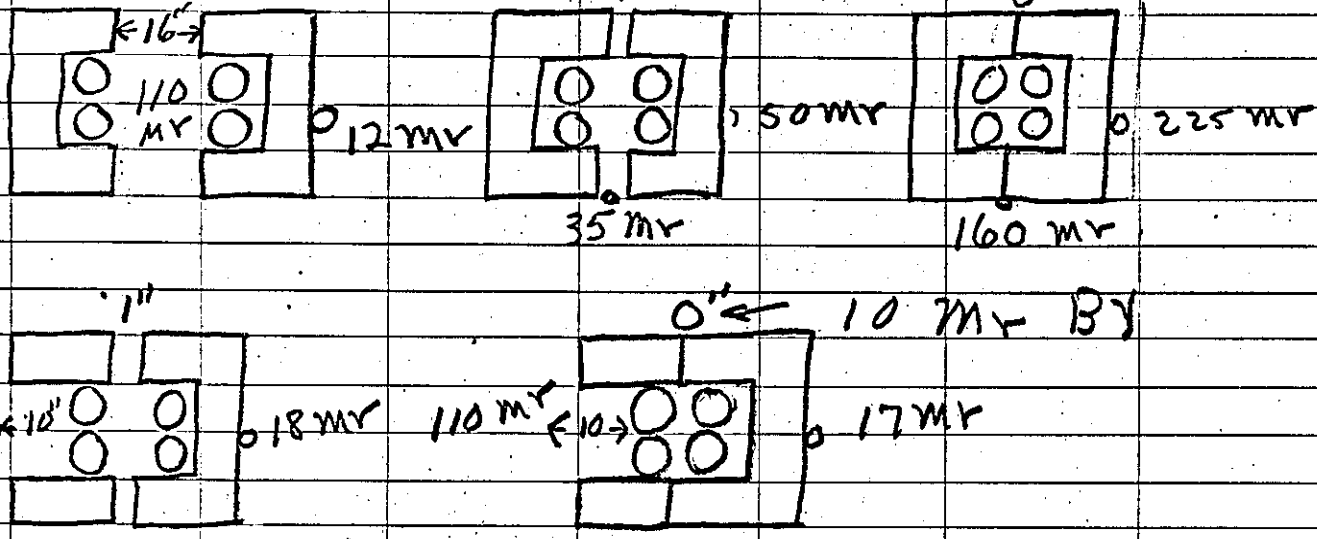
The following basic data was used for above est.

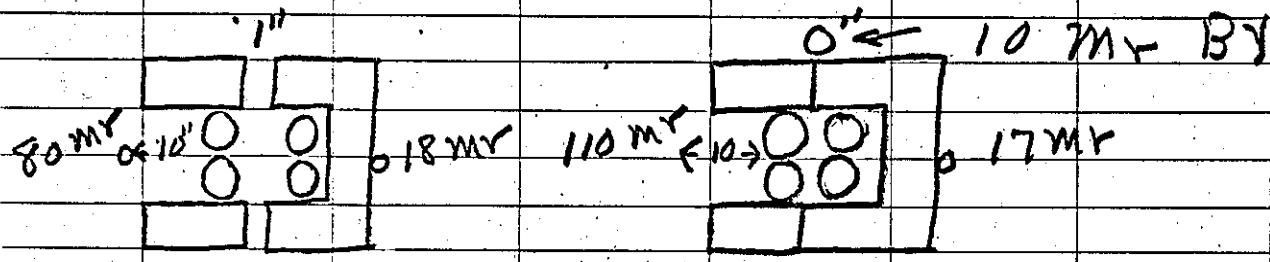
TABLE SEP (in)	BF3 A (CPM)	BF3 B (CPM)	IC #4 * (10^6)	IC #3 (10^6)	Date	No. of 8" SIDES	ORNL FN SURVEY METER	IC #2 10X10"
53	4803	583	.004	.00125	5 FEB 74	6	–	–
7	7495	726	.010	.0019	–	–	–	–
3	13478	1044	.022	.0028	–	–	–	–
1	24883	1612	.045	.0046	–	–	–	–
0	127806	7261	.240	.020	–	–	–	–
53	4863	630	.0046	–	7 FEB 74	6	7	5
16	5850	635	.0063	.0016	–	–	12	–
1	25620	1630	.045	.0048	–	–	50	8.5
0	125000	6920	.24	.020	–	–	225	31
53	4750	–	.0046	.0014	7 FEB 74	5 **	–	0.5
1	9700	1272	.015	.0019	–	–	18	2.7
0	14910	1610	.019	.0022	–	–	19	3.1

** A full (Bare) side (but 16" wide) was removed from North

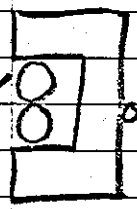
* IC #4 was located @ ℄ of fuel on back side of concrete (5" away from concrete) on South table. This is the same position as ORNL FN Survey meter readings were taken.

Run 41W 1-7-74



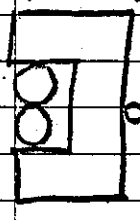


2-13-74



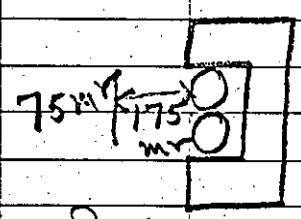
2-14-74 200 MR BY

15 Min After Run

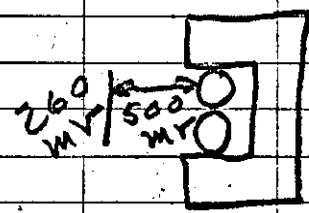


2-19-74

7 MR BX



Approx 35 Min After Run



Before Run

All Readings Are Mrems Neutrons Except where Indicated By BY

41x 2x2 8" concrete on 6 sides.
Spacing: cyl to cyl flange = 0.125"; .318cm
cyl to conc. flange = 0.0625"; .159cm
℄ to ℄ cyl = 92.843cm

Stopped @ ~~3k~~ 3k mils table separation with a positive ≈ (+27#). Separate & make slight alignment of the concrete.

41y Align concyte somewhat and add one piece of boral on each side 7⅛" horiz. #5 x 3¾" high by ⅛" thick. Bottom horizontal edge even with weld of cyl. flange.

Stopped @ 8 mils table separation with a positive period of ≈ (+5#).

41zA make slight alignment

	West	East		IC#3		IC#4
Res (+)	.101	.108	closed	+327.5sec	3.52#	+336.6sec; 3.26#
DC (∞)	.111	.120				

+ to ∞ = 11 mils = +3.39# or 0.308 #/mil

k∞ @ 0.011"

41zB Remove 1 piece of boral from North table (ref 41y).

				IC#3	IC#4
Res (+)	.101	.109	closed	+49.94sec; +16.01#	+50.67sec; +15.8#
DC (∞)	.147	.157		∞	

+ to ∞ = 47 mils = 15.93# or 0.339 #/mil

k∞ @ 0.047"

41zA vs 41zB = 15.93 - 3.39 = 12.54# per boral piece.

∴ 15.93 + 12.54 = 28.47# clean-closed via "boral calculations".

Instrument Check on FEB 8 1974 Source ^{60}Co #20 Taylor & Lynn

FM-1 875 volts Lor Trip SCRAM o/c Trip o/c

IC-1 3×10^{-10} Meter Trip o/k Fast Trip o/k

IC-2 3×10^{-10} Meter Trip o/c

IC-3 10^{-9} Calibration o/c

IC-4 10^{-9} Calibration o/c

Rm #113 - Negtem t = 19.0°C Area clear

Bldg alarm A o/c B o/c C o/c

42A Repeat with no boral in i.e. "clean" conf. ✓

(36)

	West	East		IC #3	IC #4
Pos (+) =	.100	.106	closed	+23.34 rec; 25.61¢	23.34 rec; 25.61¢
∞ =	.172	.179			

+ to ∞ = 72.5 mils = ~~25.61¢ 0.353¢/mil~~

k_∞ @ 0.073"

42B Remove Top (all)

(37)

			IC 3	IC 4
Pos. (+) =	.100	.106	+47.41 rec; 16.59¢	+47.77 rec; 16.50¢
∞ =	.148	.152		

+ to ∞ = 47 mils = 16.55¢ = 0.352¢/mil

closed = 42a vs @ → ∴ top = ~~16.99¢~~ 9.06 ← wes

∞ → ∞ = ~~25.5 (.38 from cam)~~ = 9.69¢ 9.94

25.5 (.39)

k_∞ @ 0.047"

43A (38) Change spacing to flange cyl to cyl = 0.159 cm
cyl to conc = 0.080 cm
℄ to ℄ = 22.684

2 x 2 5 sides - 8" conc.

	W	E		IC #3	IC #4
Pos (+)	.275	.278	.276	+48.59; 163 ¢	+48.86 cm; 16.26 ¢
DC (−)	.312	.316	.314		

+ to ∞ = 37.5 mils = 16.29 ¢ = 0.434 ¢/mil

actual sep @ ∞ = 210 mils (.38) = 79.8 ¢ @ closure

∞ → 43a vs 41a = 377 vs 214 = 163 mils (~~.42~~) = +68.5 ¢ − 150 = 81.5

Pos 43a vs 41a = 336 vs 176 = 160 (.42) = +69.2 − 150 = 81.8

~~43a vs 41a = 150 − 29.8 = 10.2 ¢~~

~~Ave of 3 = 81.0 ¢~~

Avg of 3 = 81.0 ¢ @ closure

k > 1 (16.29 ¢) @ 0.174"
k ∞ @ 0.211"

72

Instrument Check on FEB 11 1974 Source ^{60}Co #20 Taylor & Lynn

PS-1 875 VOLTS Low Trip OK : Trip SCRAM-OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarms

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Rm #113 ; Neg. Press (.17) ; t = 19.2°C C OK

Area Cleared

43B (39) Same as 43A BUT add full 8' top. (usual 58" vert. inside meas.)

	Wet	Est	IC#3	IC#4
Pos(+)	.311	.317	+65.87 sec; +13.19#	+66.23 sec; +13.16#
DC(∞)	.341	.350		

Pos to ∞ = 31.5 mils = 13.17# or 0.418#/mil

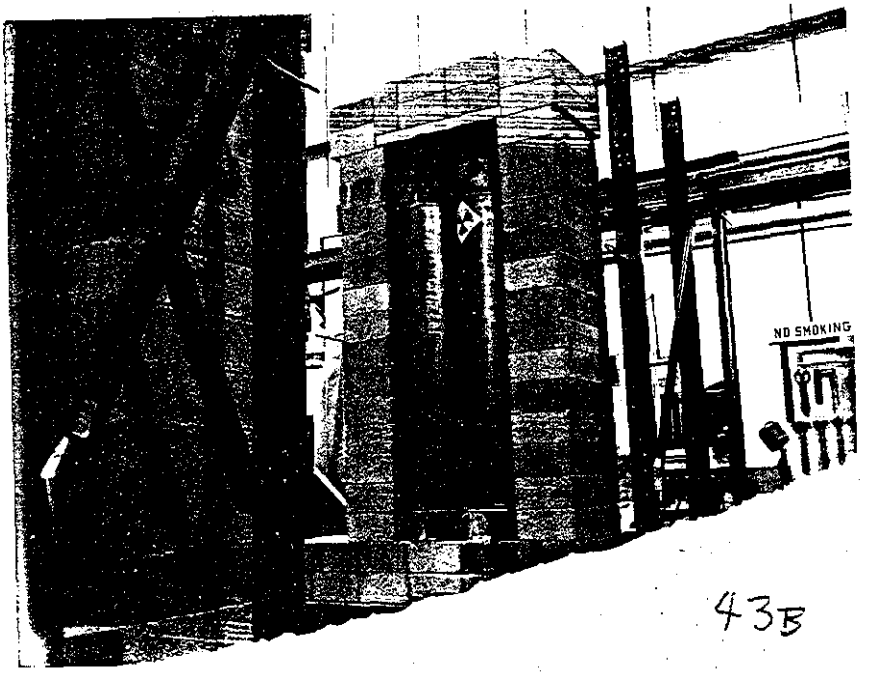
43B vs 43A = 13.17# value of top.

Using closure calculations 43B vs 43A = 13.58#

diff @ closure ∴ Top value

K>1 (13.17) @ 0.211"

K∞ @ 0.243"



43B

Lynn

Instrument Check of FEB 12 1974 **Source** ^{60}Co #20

Taylor & Lynn

PM-1 875 Volts Low Trip OK (5 min) Trip OK

IC-1 3×10^{-10} Meter Trip SCRAM OK Test Trip OK

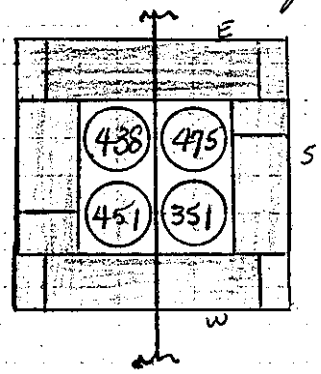
IC-2 3×10^{-10} Meter Trip OK Bldg Alarms

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Run #113 = Deg Prec. $t = 19.2°C$ Area Cleared C OK

44A (40)



Avg ρ = 4.043 gm/cc UF6 est.

Spacing - cyl-cyl = 3.175 cm
cyl-conc = 1.588 cm
ℓ to ℓ = 25.700 cm
ht = 85.09 cm

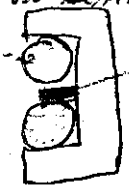
2 x 2 / (5 sides reflected with 8" concrete)

table closed IC #4 reads 0.12 (ref pg 68)
IC #2 reads 18.5 E-11
BF_3 #A 76080
B 3750

44B add plexiglass to each side symetrically.
16" x 6" x .930" to north table (one piece)
16" x 6" x .960" to south table (3 pieces)

	west	East	IC #3	IC #4
Positive (+)	.155	.158	+33.66 sec; 20.67 ¢	+32.0 sec; 21.31 ¢ Avg 20.99
DC (∞)	.216	.221	∞	
Neg (−)	.243	.248	−18.4 sec −9.07	−18.9 sec; −8.15 ¢ Avg −8.86

k>1 (20.99¢) @ 0.054"
+ to DC = 62 mils = 20.99¢ = 0.3385 ¢/mil
DC to − = 27 mils = −8.86 = 0.3281 ¢/mil
k_{∞} @ 0.116"
k<1 (8.86¢) @ 0.143"



44C Remove 100 mils plex from south table

	west	East	IC 3	IC #4
closed Positive (+)	.100	.106	+16.01 sec; 31.30¢	Same
DC (∞)	.201	.209	∞	

k_{∞} @ 0.102"

+ to DC: 102 mils = 31.30¢ = 0.313 ¢/mil

74

Lynn & Cross

Instrument Check on FEB 13 1974 Source 60Co #20

PS-1 -875 V. Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip ok Fast Trip Screws ok

IC-2 3×10^{-10} Meter Trip ok Mfg alarms

IC-3 10^{-9} Calibration ok A = ok

IC-4 10^{-9} Calibration ok B = ok

Press ok t = 19.2°C C = ok

Personnel - ok (CC)

12" Concrete [4 sides]

45A - Removed plexiglas.

(41) added 4" Concrete to 4 sides (E, W, N & S)

	W	E		Ic-3	Ic-4	Avg.
Pos (+)	.439	.449	.444	25.84 sec, 24.18¢	26.58 sec, 23.80¢	23.99¢
D.C (∞)	.508	.520	.514	∞	∞	
Neg (-)	.539	.551	.545 -162.86	", -10.61¢	160.69 sec, 10.82¢	10.72¢

+ to DC = 70 mils = .3427 ¢/mil

DC to − = 31 mils = .3458 ¢/mil .3442 ¢/mil

≅ 1.40¢

$t_1 > 1$ (23.99¢) @ 0.341"

$t_2 = \infty$ @ 0.411"

$t_3 < 1$ (10.72¢) @ 0.442"

Lynn & Cross 75

Instrument Check on FEB 14 1974 Source 60 Co #20

FC-1 875 V Low Trip ok Trip ok

IC-1 3×10^{-10} Meter Trip ok Test Trip ok

IC-2 3×10^{-10} Meter Trip Scram ok Cable Warms

IC-3 10^{-9} Calibration ok A = ok

IC-4 10^{-9} Calibration ok B = ok

Press - ok $t = 19.2°C$ C = ok

Area Cleared - JJL

16" Concrete (3 sides)

46 A (42) - Added 4" Concrete to 3 sides (N, S & E).

Avg. 23.99#

10.72#

.3442#/mil

	W	E		IC-3 P	IC-3	IC-4 T	IC-4 P	Avg.
Pos (+)	.558	.560	.559	22.53	26.12#	23.16	25.72#	25.92#
DC (∞)	.634	.637	.635	∞				
Neg (−)	.669	.673	.671	-145.49	-12.57#	Same		-12.57#

$k > 1$ (25.92#) @ 0.456"
$k \infty$ @ 0.533"
$k < 1$ (12.57#) @ 0.565"

+ to DC = 76.5 mils = .3388#/mil

DC to Neg = 35.5 mils = .3541#/mil

.3464#/mil

45 A vs 46 A

∞	.514	.6355	= .1215"	121.5 x .3464 = 42.09#

46 B (43) - added 8" Concrete to top.

Cavity = 58" ht.

	W	E		T	IC-3 P	T	IC-4 P	Avg.
Pos (+)	.670	.670	.670	48.50	16.34#	49.94	16.01#	16.18#
DC (∞)	.717	.719	.718		∞			

Pos to DC = 48 mils = .3371#/mil

46 A vs 46 B = Value for top

∞	.6355	.718	= 82.5 mils x .345	= 28.51#

or

-12.57 to +16.18 = 28.75#

$k > 1$ (16.18#) @ 0.562"
$k \infty$ @ 0.615"

76

Lynn & Crane

Instrument Check on FEB 1 5 1974 Source _____

IC-1 875 V Low Trip ok Scram Trip ok

IC-1 3×10^{-10} Meter Trip ok Fast Trip ok

IC-2 3×10^{-10} Meter Trip ok Bldg alarms

IC-3 10^{-9} Calibration ok A = ok

IC-4 10^{-9} Calibration ok B = ok

Press - ok Temp - 19.2° C C = ok

area cleared — cc.

46 C (44) Removed 4" Concrete from 3 sides. (N, S & E)

	W	E		IC-3 ρ		IC-4 ρ		Avg.
Poo (+)	.542	.544	.543	41.80 sec	18.02 ¢	41.98 sec	17.97 ¢	18.00 ¢
∞	.598	.602	.600	∞				

+ to ∞ = 57 mils .3158 ¢/mil

46 B vs 46 C

∞ .718 .600 118 mils X .3264 = 38.5 ¢ (3 sides)

45 A vs 46 C

− .545 + .543 18.00 − .66 = 17.34 ¢

10.72

28.06 ¢ Top

k_t = 1 (18.00 ¢) @ 0.440"

k_{av} @ 0.497"

Taylor & Lynn

Instrument Check on FEB 19 1974 Source ^{60}Co #20

RM-1 875 Low Trip OK : Trip ~~60 #20~~ SCRAM OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK

IC-3 10^{-9} Calibration OK

IC-4 10^{-9} Calibration OK

Bldg Alarms

A OK

B OK

C OK

Run # 113 = Neg. Pion : Area Cleared

46D Remove 4" from 4 sides ∴ 2 x 2 with 6 sides reflected with 8" concrete.

Set

Add 2 pieces of plexi (ref run #45) each .235" x 12" x 6" to each table.
→ 12" is vertical and against concrete
→ 6" is NS
→ Placed symetrically - NOTE: that bottom of plexi is now one inch from the base concrete.

Table closed = set.

46E Remove all plexi (ref 46D)
Add .785" x 16" x 6" to South table (3 pieces from)
.737" x 16" x 6" to North table (one piece)

	DIGILIN West	DIGILIN East		IC#3	IC#4
Pos (+)	.102	.102	closed	+22.58 sec; +26.09 ϕ;	+23.16 sec; 25.73 ϕ
DC (∞)	.187	.189			
Neg (-)	.217	.220		-175.89 sec; -9.53 ϕ	-169.37 sec -10.05 ϕ

+ TO DC = 86.5 mils = ±25.91 ϕ = 0.300 ϕ/mil
DC to − = 30.5 mils = −9.79 ϕ = 0.321 ϕ/mil

k ∞ @ 0.087"
k 21 (10.05 ϕ) @ 0.117"

78

46F

Remove from Sonte table 274 mils thickness from (ref 46E) i.e. 137 mils from each side of the 755" thickness (ref 46E)

	West	East		IC H3	IC H4
Pos (+)	.101	.102	closed	+377.4 sec: +3.09¢ / 534.5 / +2.24 avg	+466.7 sec: +2.55¢ / 581.5 / +2.82 avg = 2.04¢

46F vs 46E = +2.82¢ vs 25.91¢ = 23.09¢ → 23.07¢ → 2.14¢

274 mils of plex = 23.07¢ = .0868¢/mil

1208 mils (.0868¢/mil) = 104.85¢ of plex. (104.8¢ → change type)

∴ 2x2 (6 sides)/8" concrete = +2.14 − 104.85 = −102.71

$f_2 > 1$ (17.83¢) @ 0.378"
k_∞ @ 0.423"

47D vs 47C direct meas (position)

+17.83¢ vs −8.64¢ = 26.47¢ value of 274 mils of plex.

Plex. ¢/mil = 0.0966¢

∴ 1208 (.0966) = −116.69¢ with all plex out

Value from curve ~~& closed~~ = +136.08¢ = +19.41¢ clean conf.

Do Not Use

Taylor & Lynn

Instrument Check on FEB 20 1974 Source ^{60}Co #20

PR-1 875 VOLTS Low Trip O/C Trip OK

IC-1 3×10^{-10} Meter Trip SCRAM OK Fast Trip O/C

IC-2 3×10^{-10} Meter Trip O/C

IC-3 10^{-9} Calibration OK

IC-4 10^{-9} Calibration O/C

Run #43 Area = Neg Area Cleared

Bldg Alarm
A OK
B OK
C OK

47A 2 x 2 cyl. are same as Run #44A

8" concrete on 5 sides

Spacing cyl to cyl flange = 2.489cm
cyl to concrete = 1.245cm
℄ to ℄ = 25.014 cm

closed table is sub-critical. IC #3 = .008 from .00135

47B Same but restack concrete to eliminate an open space at inner corner which was 3 inches across and 5" deep. NOTE that 8" of concrete was stacked behind the gap in 47A

closed table is sub-critical IC #3 = .05 from .00135

47C Repeat but add plex as described Run #46E

	West	East	IC #3	IC #4
Pos (+)	.476	.481	+42.34 sec; 17.87#	+42.61 sec; +17.79#
∞ DE	.521	.527	≈	Avg = 17.83#

+ to DE → 45.5 mils = 17.83# = 0.392#/mil

47D Remove same plex as described Run 46F

	West	East	IC #3	IC #4	
Pos (+)	.416	.423	+58.99 sec; +14.31#	+60.26 sec; +14.06#	14.19#
DE (∞)	.453	.461	≈		
Neg (−)	.475	.482	−195.43 sec; −8.28#	−183.49 sec; −9.0#	8.64#

+ to ∞ = 37.5 mils = 0.378#/mil
∞ to − = 21.5 = 0.419#/mil

k > 1 (14.19#) @ 0.319"
k ∞ @ 0.356"
k < 1 (8.64#) @ 0.378"

80 47E Add (from nothing) 2 pieces of plexi ~~to~~ each side (.2375" x 12" x 6")

Pos (+)	West	East		IC#3	IC#4
∞	.224	.231	227.5	+50.67 sec; +15.86#	Same
	.264	.273	268.5	∞	

+ to ∞ = 41 mils = 15.86# = 0.387#/mil @ ≥ 144 sep.

f_c > 1 (15.86#) < 0.127"
f_c ∞ @ 0.163

47F Remove one piece from Santo table

Pos (+)	West	East		IC#3	IC#4
∞	.145	.151	148	+28.23 sec +22.96#	~~+28.77 sec~~; 22.73#
	.210	.219	214.5	∞	

66.5 mils = 22.85# or 0.347#/mil @ ≥ 78 mils

∞ to ∞ = 54 mils @ .365#/mil = 19.71# per unit

plexiglass → 19.71# x 3 = 59.13# value to be removed
spacing → 114.5 mils (.34) = 38.93# value by closing
−20.20# clean conf. 5 sides

i.e. (.34) is avg #/mil from est curve between 115 mils & closed.

\+ 43 mils to closed from the (+) period

19.71 (3) = 59.13# to be removed i.e. plexi
43 mils (.34) = 14.62# to be added by closing table
Period = 22.85# to be added (of Pos period above).
−2.66#

f_c > 1 (22.85#) @ 0.043"
f_c ∞ @ 0.110"

Instrument Check on FEB 21 1974 Source Co 60 #20

PM-1 875 volts Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip SCRAM OK

IC-2 3×10^{-10} Meter Trip OK Abnormal (Alld)

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Rx. #113 : Neg Pres : Area Cleared C OK

48A (45) 2 x 2 6 sides reflected with 8" concrete closed and sub-critical.

48B Add one piece of plexi to each (table) side (.2375" x 12" x 6")

	West	East		IC#3	IC#4
Pos (f)	.100	.101	closed	+29.68 sec ; 22.30¢	+29.86 sec ; 22.22¢
DC (∞)	.172	.179			avg 22.26¢

75 mils = 22.26¢ = 0.297 ¢/mil

k_s @ 0.075"

48C Remove one piece from South table.

	West	East	IC#3	IC#4
Pos. (f)	.101	.102	+1100 sec ; +1.12¢	+1160 sec ; 1.06¢

IC#2 = +1273 ; 0.97¢ avg +1.05¢

Value of one piece plexi = 21.21¢

∴ Value calc of conf +1.05 − 21.21 = −20.16

48D (46) Same as 48B ~~except~~ top is removed. 5 sides reflected

	West	East		IC #3	IC #4
Pos (+)	.100	.100	.100	+9.40 sec; +10.13¢	+9.67 sec; +10.24¢
DC (∞)	.132	.136	.134		Avg 10.19¢
Neg (-)	.154	.158	.156	-213.3 sec; -7.39¢	-225.2 sec -6.90¢

avg 7.15¢

48B vs 48D = 22.26 - 10.19 = 12.07¢ Value Top use

+ to ∞ = 34 mils = 10.19¢ ≈ 0.300¢/mil @ ≈ 17 mils
∞ to - = 22 mils = 7.15 ≈ 0.325¢/mil @ ≈ 43 mils

∴ 10.19 = add as period
42.42 = sub. as plexi
-32.23 is clean conf [Using 48c plexi values]

k∞ @ 0.034"
k<1 (7.15¢) @ 0.056"

k∞ @ 0.072"

48E Add 0.129" x 12" x 6" to South Tabl, for plexi evaluation check.

Value of 0.129 piece = 48D vs 48E = 12.34¢

	West	East		IC #3	IC #4
Pos (+)	.100	.100	.100	+28.77 sec; 22.71¢	+29.59 sec; 22.34¢
DC (∞)	.169	.175	.172		Avg 22.53

app 72 mils: 22.53¢ = 0.313¢/mil @ ≈ 36 mils position
129 mils plexi: 12.34¢ = 0.0957¢/mil

∴ 22.53¢ add as period
57.80¢ remove [.6957 x 604 for 604/mil plexi value]
-35.27¢ is clean conf [Using 48E value of plexi]

D+E/2 = -33.75¢

3x3 # Concrete — J.R. TAYLOR & J.J. LYNN — 83

Instrument Check on FEB 26 1974 Source ^{60}Co #20

PM-1 875 VOLTS Low Trip SCRAM OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Post Trip OK

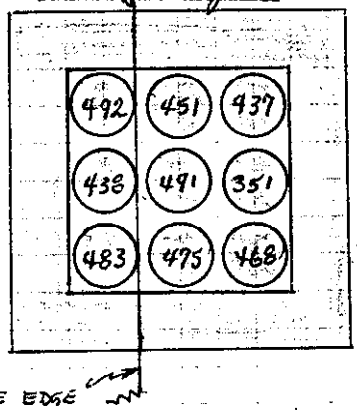
IC-2 3×10^{-10} Meter Trip OK Bldg Alarms

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Rm #113 = Neg Pres. Area Cleared C OK

49 A



3x3 ARRAY

BOTTOM = 8" CONCRETE
S, N, W = 8" CONC.
E = 8" ON ONLY 1/3

Closed table - Sat - very little multiplication.

SPACING FLG-FLG = 8.255 cm
" FLG-CONC = 4.128 cm
℄ to ℄ CYLINDER = 30.780 cm

49 B (47) SAME BUT ADD REMAINING CONCRETE TO EAST SIDE.
∴ 5 SIDES REFL. WITH 8" CONCRETE

	WEST	EAST	IC #3	IC #4
POS. (+)	.521	.531	+27.69 rec; +22.30¢	+28.02 rec; +23.08¢ AVG +22.69¢
DC (∞)	.627	.639	∞	
NEG (−)	.670	.682	−180.0 rec; −9.23¢	−189.0 rec; −8.62 AVG −8.93¢

+ to ∞ = 106 mils = 22.69¢ = 0.214¢/mil
∞ to − = 44 mils = 8.93¢ = 0.203¢/mil

∴ ROUGH EST. CALC. TO CLOSED TABLE:
530 mils (.2¢/mil) = +106¢
probably more like +90¢ due to ¢/mil est.

$k > 1$ (22.69¢) @ 0.426"
$k = \infty$ @ 0.533"
$k < 1$ (8.93¢) @ 0.576"

84

49C

Change flange spacings:

Spacing flg - flg = 8.662 cm

" flg-cone = 4.331 cm

Σ to Σ cyl. = 31.186 cm

table lacked about 50 mils closing due to some physical restriction of alignment. Was approx. ∞ @ this point as indicated by LD.

49E

Taylor & Lynn

Instrument Check on FEB 27 1974 Source ^{60}Co #20 85

PM-1 875 Volts Low Trip OK Trip SCRAM OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK

IC-3 10^{-9} Calibration OK

IC-4 10^{-9} Calibration OK

Rm #3 = Neg Pres. Area Cleared

Bldg Alarm

A OK

B OK

C OK

e
ment
cated

49D (48) Make alignment adjustments

	West	East		IC #3	
Pos (+)	.100	.107	closed	+.9400 sec	+0.14¢

49E (49) Add full 8" top to 49D

	West	East	IC #3	IC #4	Avg
Pos (+)	.912	.922	+34.48 sec; +20.36¢	+36.51 sec, +19.65¢	Avg +20.01
DC (∞)	1.006	1.016	∞	∞	
Neg (−)	1.047	1.058	−205.2 sec; −7.76¢		

+ to ∞ = 94 mils = 20.01¢ = 0.213¢/mil

∞ to − = 41.5 mils = 7.76¢ = 0.187¢/mil

t > 1 (20.01¢) @ 0.813"
t ≈ ∞ @ 0.908"
t < 1 (7.76¢) @ 0.941

Rough est to closed = .906" (≈ .175¢/mil est) = 159¢

49F (50) Remove 4" concrete from the top.
∴ 5 sides = 8" ; Top = 4" concrete.

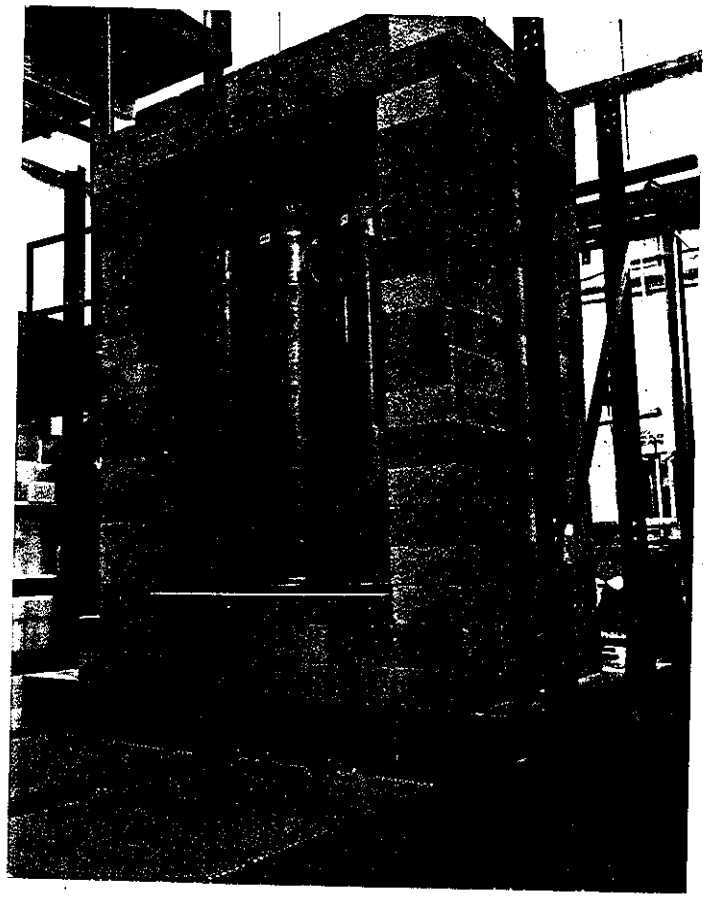
	West	East	IC #3	IC #4	Avg
Pos (+)	.761	.771	+71.1 sec; +12.49¢	+66.04 sec; +13.18¢	Avg 12.84
DC (∞)	.819	.831	∞	∞	
~~Neg~~ (−)	.844	.855	−317 sec; −3.62	−330 sec; −3.50¢	avg 3.56

+ to ∞ = 59 mils : 12.84¢ = 0.218¢/mil

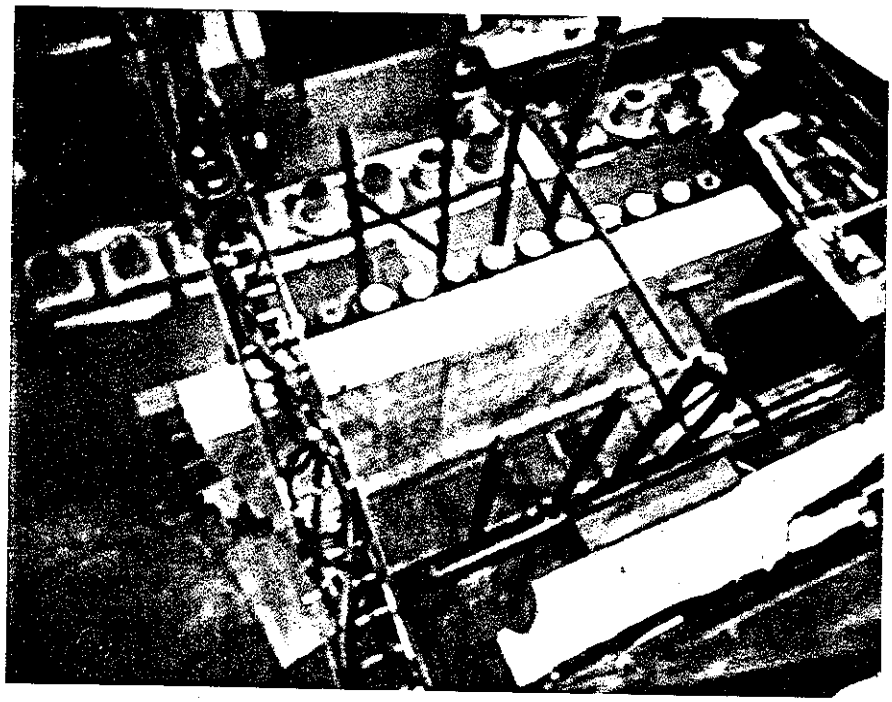
∞ to − = 24.5 mil = 3.56¢ = 0.145¢/mil

Rough est to closed (as above) = .720 (≈ .175¢/mil est) = 126¢

t > 1 (12.84¢) @ 0.663"
t ≈ ∞ @ 0.722"
t < 1 (3.56¢) @ 0.746"



49 E



50 D

LINEAR BEAM + CONCRETE

Instrument Check on FEB 28 1974 Source ^{60}Co #20 Taylor Lynn.

HV-1	875 VOLTS	Low Trip O.K.	Trip O.K.
IC-1	3×10^{-10}	Meter Trip SCRAM O.K.	Fast Trip O.K.
IC-2	3×10^{-10}	Meter Trip O.K.	Bldg alarms
IC-3	10^{-9}	Calibration O.K.	A O.K.
IC-4	10^{-9}	Calibration O.K.	B O.K.
Rm #113 - Neg Bias (0.160)		Area Cleared	C O.K.

50A Close pack linearly ℄ to ℄ = 22.525 cm 6 cyl

NORTH ← 492 - 483 - 438 | 351 - 468 - 437

BF_3 when table sep. = 26100 cpm

BF_3 and table closed = 70450 cpm

Sat

closed table West = .100; East = .099

8" concrete on bottom

8" on ~~East~~ side

50B 11 cylinders

Sat

8" Bottom

8" One Side

485-439-492-483-438 on NORTH

351-468-437-451-475-491 on South

↑ BF_3 table separated = 40500 cpm

BF_3 table closed = 100700 cpm

150c 13 cylinders

8" Bottom

12" on Movable Table (one side) East

8" on Stationary " (one side) East

NORTH ← 485-439-492-483-438 | 351-468-437-451-475-491-453-494

↑ CBF_3 table separated = 53200 cpm

BF_3 table closed = 101500 cpm

Taylor & Lynn

Instrument Check on MAR 1 1974 Source ^{60}Co #20

PM-1 875 VOLTS Low Trip OK Trip O/C

IC-1 3×10^{-10} Meter Trip OK Fast Trip SCRAM O/C
IC-2 3×10^{-10} Meter Trip OK Bldg Alarms
IC-3 10^{-9} Calibration O/C A OK
IC-4 10^{-9} Calibration O/C B OK
R#113 = Deg Rm Area Cleared C OK

(52)

50D 13 cylinders

Photo 12" Wall of Concrete on East side only
BF_3 same position table separated: 56850 cpm
BF_3 — table closed: 89100 cpm

50E Same cylinders - Same 12" Wall on East side of the linear array. (53)
Add 8" concrete to West side of #351 #438 ≠ #468 #483
i.e. 4-4" thick blocks high only.

Put BF_3 in slightly diff. position:
BF_3 Table separated = 24000 cpm
BF_3 Table closed = 40000 cpm

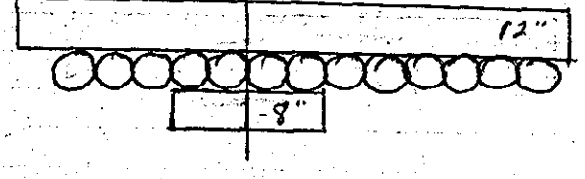
50F Complete the single stacks (50E) to 14 blocks high. (5)
13 cyl
BF_3 - Sep → = 27000 CPM

	West	East
Pos (+)	.309	.281

IC #3
+37.80 sec ; +19.22 #

est closed 285 x .353 = > 85 #

NORTH ←



R>1 (19.22#) @ 0.195"

(51) **50G** Same but remove cyl # 494 from table. Note that a small crack was closed (adjusted) in the 8" concrete

12 cyl

	West	East	IC #3
Pos. (+)	.308	.283	+22.49 sec ; +26.15#
DC (∞)	.382	.357	∞

$t_s > 1$ (26.15#) @ 0.196"
$t_s = \infty$ @ 0.270"

74 mils = 26.15# or 0.353#/mil
260 x .353 = ≈ +92# calc est. closed
∴ #494 value is insignificant change due to crack.

(52) **50H** Same as 50G except remove cyl #485

11 cyl

Value #485 = 9.52#

	West	East	IC #3
Pos (+)	.308	.285	+47.18 sec ; +16.63#
DC ∞	.356	.333	∞

$t_s > 1$ (16.63#) @ 0.197"
t_∞ @ 0.245"

48 mils = 16.63# = 0.346#/mil
230 x .346 = ≈ 80# calc closed

Relative Cubic Pie after shutdown → 453 = 18 mps/in ; 491 = 26; 475-36; 451=52; 439=90

(53) **50I** Same but remove cyl #453

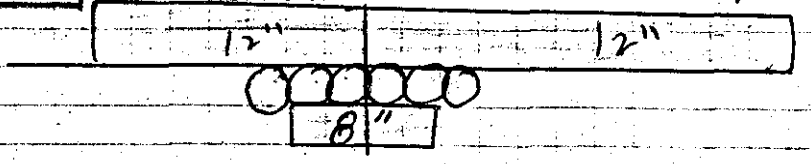
10 cyl

	West	East	IC #3
Pos (+)	.306	.285	+58.42 sec ; +14.37#

$t_s > 1$ (14.37#) @ 0.196"

Value #453 = 2.26#

(54) **50J** Remove 491-475-451 & 439 — 6 cyl



very slightly sub at 30 mils from closure. L_n = 0.04

90 1 x 5 array TAYLOR & LYNN

Instrument Check on MAR 4 1974 Source ^{60}Co #20

875 volts Low Trip OK Trip OK

3×10^{-10} Meter Trip OK Fast Trip OK

3×10^{-10} Meter Trip SCRAM OK Bldg Alarm

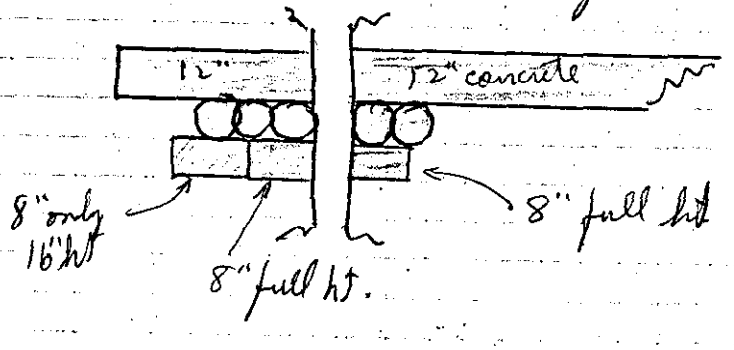
10^{-9} Calibration OK A OK

10^{-9} Calibration OK B OK

Room #113 - Neghris; Area Cleared C OK

50K Remove Cyl #437

Add 16" high concrete to West side of #492.



Sub $hN^{\#3} = 0.03$ ~30 mils from closed due to alignment.

50L ADD to the partial stack (of 50K) to make the [8" only 16" ht] become [8" only 28" ht.

	West	East	$TC^{\#3}$
Por. (+)	.427	.409	+41.34 sec; +18.15°
(-)	.493	.477	

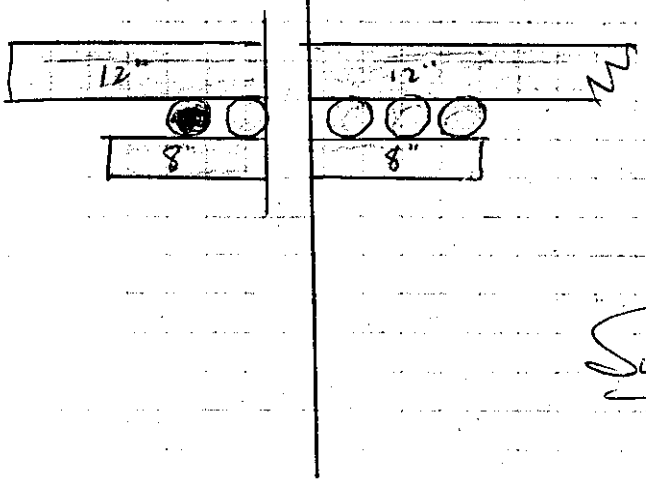
67 mils = 18.15° or 0.271°/mil

485 - 108 = 377 to closed (.271) = est 102°

$k > 1$ (18.15°) @ 0.318"

k_∞ @ 0.385"

50M Remove #492 from Abut 1 Make Spacing of 1 5/8"
Reinstall #437 to South



cylinders

483-438 | 351-468-437

Space between cyl = 4.138cm
Flgs touch concrete i.e. 0"
℄ to ℄ = 26.663cm

Sub — 30 miles from closed table, very little multiplication
$\delta N = .006$

50N Add full cycles at touch of concrete, Except that there is a 0.87" crack at North West corner ~~of~~ movable table ~~East~~ rest are "good."

Sub $\delta N = .013$

92

Instrument Check on MAR 5 1974 Source ^{60}Co #20 JRT & LL & Boyer

PM-1 875 volts Low Trip SCRAM OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Rm #113 = Neg Pres Cleared C OK

50o ~~Add~~ 4" of concrete. ~~To Comp #666~~

(55) ∴ 12" concrete on N-E-S-W & 8" on Bottom
Spacing still 4.138cm. TOP = 0

Closed = Sub-Critical $\lambda N = 0.08$

West = 0.129 East = .111

50P Add to 50o 4 pieces of plexiglass spaced sym. between #4 & #351

Total = 0.95" x 12" x 6" placed upright and resting on concrete.
Super est. > 5¢ i.e. greater than 5¢

50Q ~~Remove~~ Add above plexi (ref 50P) 0.989" x 6" x 6"

	West	East	IC #3	IC #4	Avg
Pos (+)	.128	.110	closed +21.7 sec; +26.67¢	+22.69 sec; +26.03¢	+26.35
DC (∞)	.250	.236			
Neg (−)	.293	.278	−166.2 sec; −10.31¢	−163.1 sec; −10.59¢	−10.45

(+) to (∞) = 124 mils = 26.35¢ or 0.213 ¢/mil
(∞) to (−) = 42.5 mils = 10.45¢ or 0.246 ¢/mil

$k > 1$ (26.35¢) @ 0.019"
$k = 0.143$"
$k < 1$ (10.45¢) @ 0.186"

50R **Remove** one piece (.130" x 16" x 16") 93

	West	East		IC #3	IC #4	Avg
Res (+)	.127	.110	closed	+25.72 sec; 24.24¢	+26.43 sec; 23.86¢	24.05¢
IC (∞)	.243	.227		∞		
Neg (−)	.275	.259		−214.6 sec; −7.34¢	−212.5 sec; −7.45¢	

(+) to (∞) = 116.5 mils = 24.05¢ = 0.206 ¢/mil

(∞) to (−) = 32 mils = 7.39¢ = 0.231 ¢/mil

$t_r = \infty$ @ 0.117"
$t_r < 1$ (7.45¢) @ 0.149"

Value one piece = 2.30¢

50S **Remove** another (.130" x 16" x 16")

& the remaining piece is 0.729" thick. which is spaced @ 7/16" from edge of conduit.

	West	East		IC #3	IC #4	
Res (+)	.126	.110	closed	+35.36 sec; +20¢	+36.89 sec; 19.52¢	Avg 19.78¢

∴ 50Q vs 50S
26.35¢ − 19.78¢ = 6.57¢ value of 260 mils of plexi.

i.e. 0.02527¢/mil of plexi

729(.02527) = 18.42 to be removed
19.78 to be added
+1.36¢

50TA **Add** an 8" top. ∴ T = 8"
NESW = 12"
B = 8"

$t_r > 1$ (≈ 20¢) @ 0.042"

West = .172 East = .157 not closed due to alignment
estimated period worth ≈ +20¢ (est.)

50TB **Rerun** after some alignment.

West = .147 East = 134 still not closed (See closed 50S)
period worth: +30.7¢ (not drawn precise)

$t_r > 1$ (≈ 30.7¢) @ 0.022"

50Tc Repeat after alignment.

	West	East		IC #3	IC #4
Poo. (+)	.127	.113	closed	+18.00 sec; +29.48¢	+19.34 sec; 28.39¢
To (∞)	.267	.254		∞	
Neg (−)	.299	.287			

Poo (+) to (∞) = 140.5 mils = 28.93¢ or 0.206¢/mil
(−) to (−) = 325 mils = ¢ or ¢/mil

50s VS 50Tc
+19.78¢ VS +28.93¢

8" TOP Value = 9.15¢

f∞ @ 0.141¢
fC1 @ 0.173

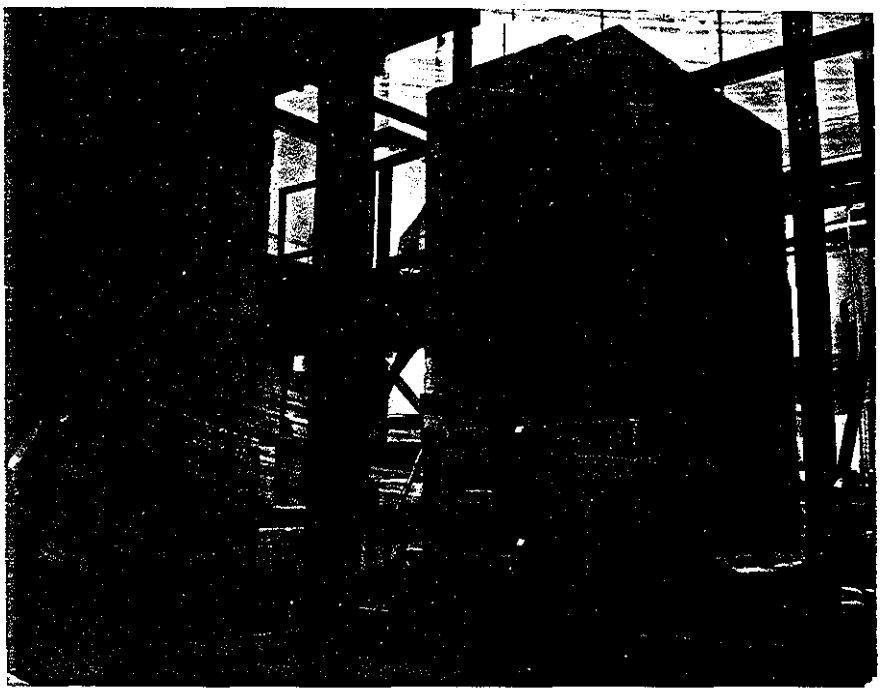
50Td (56) Remove the 0.729" plexi.
Sub (closed) Δν = 0.13 "near" critical.

50Te Add the 260 mils (ref 50s)
Value of 260 mils = 6.57¢ from 50s

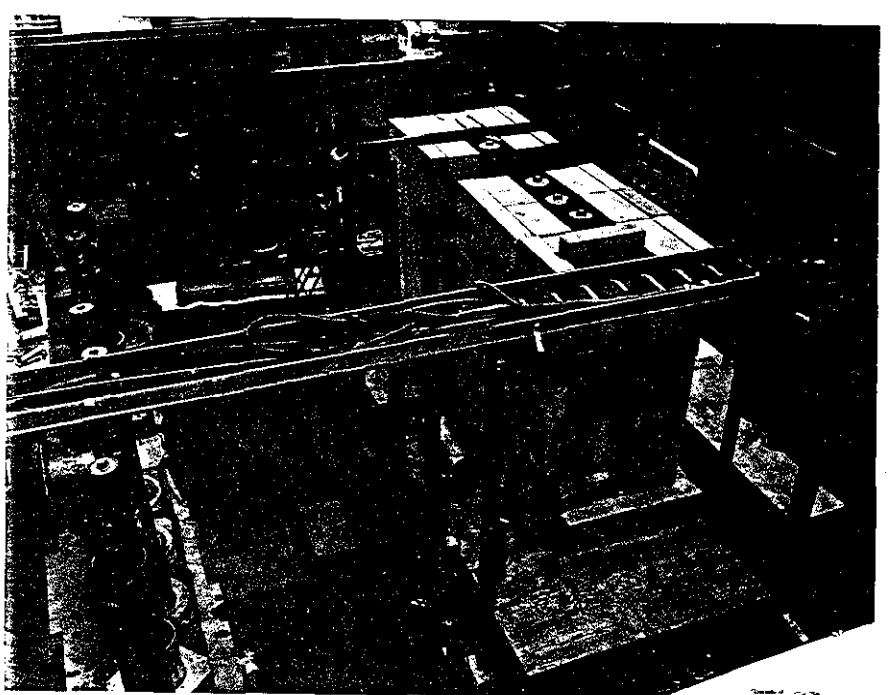
Poo (+), Table closed; West .125, East .112, IC #3 +504 sec; +2.36¢

∴ +2.36 − 6.57 = −4.21¢

Summary Clean Conf: Cyl. Spacing = 4.138 cm
Flanges Touch Concrete = 0.0 cm
BOTTOM = 8" concrete
TOP = 8" concrete
N-S-E-W = 12" concrete
Worth of 8" Top = 9.15¢
Reactivity of conf. = −4.21¢
cyl & tube = 26.663 cm



50Tc



50a

Taylor & Lynn

Instrument Check on MAR 6 1974 Source ^{60}Co #20

PR-1 875 volts Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip SCRAM OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK

IC-3 10^{-9} Calibration OK Bldg Alarm

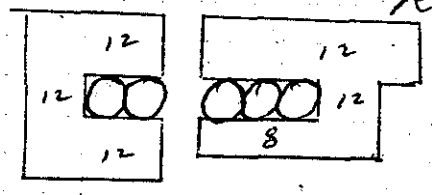
IC-4 10^{-9} Calibration OK A OK

Rm #113 : Deg Pos ; Area Cleared B OK

C OK

51

Add the 0.729" thick plexiglass (ref 50TD)
Remove 4" concrete from 3/5 of the West Reflector

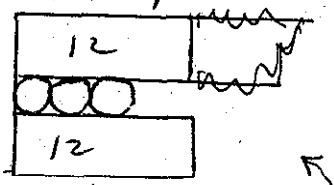


Sub closed IC#3 = 0.28

Same cyl spacing.

52

Add 4" concrete back to west wall ∴ all 12"
Remove 12" from South end of linear array.



Stationary Table

Movable Table Same as above.

Sub. closed IC#3 = 0.30

Same cyl. spacing

53A (57) Change cyl. spacing (flgs) to 3.810cm

B-8", E-12", N-12", W-12", S-12", T-8" concrete refl.

& to & cyl = 26.335cm

	West	East	IC #3	IC #4	
Pos. (+)	.125	.119	+24.10 sec; 25.16¢	+24.11 sec; +25.16¢	Avg. +25.16¢
DC (∞)	.259	.257			
Neg (−)	.300	.299	−188.6 sec; −8.67¢	−188.3 sec; −8.69	Avg. −8.68¢

+ to ∞ = 136 mils = 0.185¢/mil of table separation

∞ to − = 41.5 mils = 0.209¢/mil

50TE Vs 53A = 4.21 + 25.16 = 29.37¢

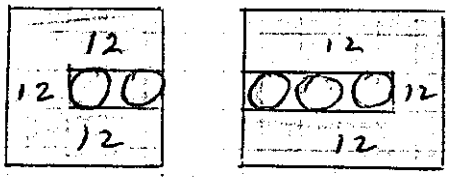
NOTE: This is at the above (pos.) position and is assumed closed at this point in time. This is the worth of changing the spacing closer by 0.318 cm

+ ∞ @ 0.136
+ −1 (8.6¢) @ 0.178

This Conf reactivity = +25.16¢ with above assumption.

See next pg. for resolution of the closed position problem

NOTE: Use #53C for final (West) reactivity.



8" on Bottom
8" on TOP @ 58" inside bot.

Clean Conf = +27.73¢
& to & cyl = 26,335 cm
flg to flg spacing = 3.810 cm
flg to contact = 0.0 cm

Worth of 0.328 cm change of cyl spacing @ ≈ 3.96 cm = 99¢/cm or 0.251¢/mil

50TE (Summary) vs 53C (Summary)

Instrument Check on MAR 7 1974 Source ^{60}Co #20 Taylor & Boyum

PI-1 875 Volts Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fast Trip Scram OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Run #113 = Deg Recs. Area Cleared C OK

53B Snug up slight alignment. Rerun 53A Make doppler chick for accuracy (used 1.25 spacing)

	West	East	IC#3	IC#4
Pos (+)	.117	.112	+21.80 sec; +27.15¢	+20.38 sec; 27.60¢
∞ DC	.259	.257		Avg = 27.38¢

+ to DC = 143.5 mils = 27.38 or 0.191¢/mil

k = ∞ @ 0.155"

53C More adjustment to concrete. Rerun 53B

	West	East		IC#3	IC#4
Pos (+)	.106	.101	closed	+20.14 sec; + ~~20.76~~	20.06 sec; 27.84¢
DC (—)	.254	.251		∞	Avg +27.78¢
Neg (−)	.302	.300		−156.1 sec; −11.30¢	−152.2 sec −11.67
					Avg −11.49¢

+ to ∞ = 149 mils = 27.78¢ or 0.186¢/mil

DC to (−) = 48.5 mils = 11.49 or 0.237¢/mil

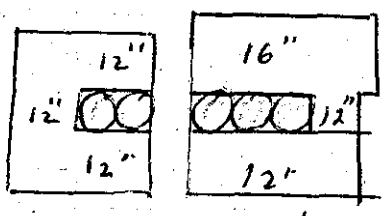
k = ∞ @ 0.144"

k < 1 (11.49¢) @ 0.198"

Reactivity of Cont closed = +27.78¢

See sketch Pg 97

53D (58) Add 4" concrete to East side of South Table.



8" TOP & Bottom

Cyl axes separation (spacing)

k > 1 (29.29¢) @ 0.146"

k = ∞ @ 0.285"

k < 1 (10.13¢) @ 0.331"

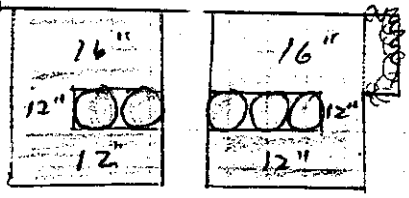
	West	East	IC#3	IC#4
Pos (+)	.252	.246	+18.00 sec; +29.48¢	+18.96 sec + 29.09¢
DC (∞)	.390	.386	∞	Avg +29.29¢
Neg (−)	.436	.433	−171.1 sec −9.90¢	Neg 165.7 −10.35¢
				Avg −10.13

+ to ∞ = 139 mils = 29.29¢ = 0.211¢/mil

∞ to − = 46.5 mils = 10.13¢ = 0.218¢/mil

53E Add 4" concrete to East side of North Table 99

(59)



Same cyl. spacing.
8" TOP & Bottom

Photo Rg 101

	West	East	IC #3	IC #4	AVG
Pos (+)	.389	.388	+42.89 sec; +17.72¢	+43.07 sec +77.67¢	+17.70
DC (∞)	.473	.472	∞		
Neg (-)	.517	.516	-172.6 sec; -9.78¢	-173.7 sec; -9.70¢	AVG -9.74

+ to ∞ = 84 mils = 17.70¢ or 0.211 ¢/mil
∞ to - = 44 mils = -9.74¢ or 0.221 ¢/mil

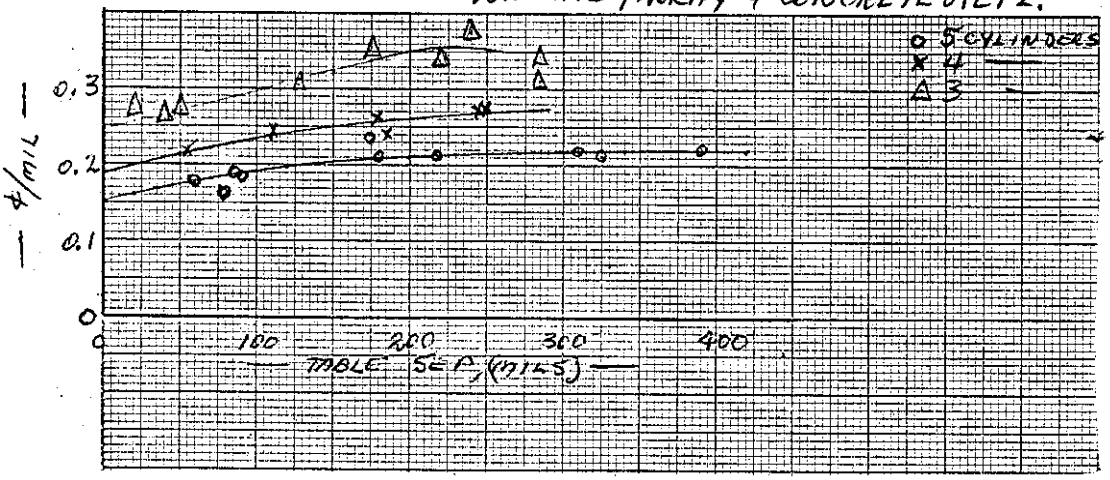
53D vs 53E = worth of 53E addition = 17.70¢
53C vs 53D = worth of 53D addition = 25.59¢ (using curve)
53C vs 53E = 4" full addition to East Side = 46.20¢ (using curve)

46.20¢ + 27.38¢ = +73.58 calc to closed

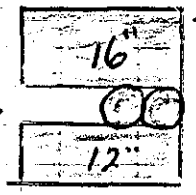
k>1 (17.70) @ 0.285"
k=∞ @ 0.369"
k<1 (9.74¢) @ 0.413"

¢/MIL VS TABLE SEP. CURVE

LINEAR ARRAY & CONCRETE REFL.



(60) 53F Remove North end concrete



Same Spacing of cyl 8" on Bottom & Top

Sat

IC#3 = 0.03

(61) 53G Add 4" concrete to open end above. i.e. 4" touching cylinder.

	West	East	IC#3	IC#4
Pos (+)	.111	.109	+39.93 sec; +18.65 ¢	+40.60 sec; +18.37 ¢
Dc (∞)	.212	.212		Avg +18.51

+ to ∞ = 102 mils = 18.51 or 0.181 ¢/mil

k>1 (18.51¢) @ 0.007

k∞ @ 0.109"

B=8, N=4, S=12, E=16, W=12, T=8 concrete replaced.

(62) 53H Add 4 more inches to North end of 53G. ∴ 8" on North end

	West	East	IC#3	IC#4
Pos (+)	.389	.389	+255.6 sec; 4.39 ¢	+284.1 sec; +4.00 ¢
				Avg +4.20 ¢

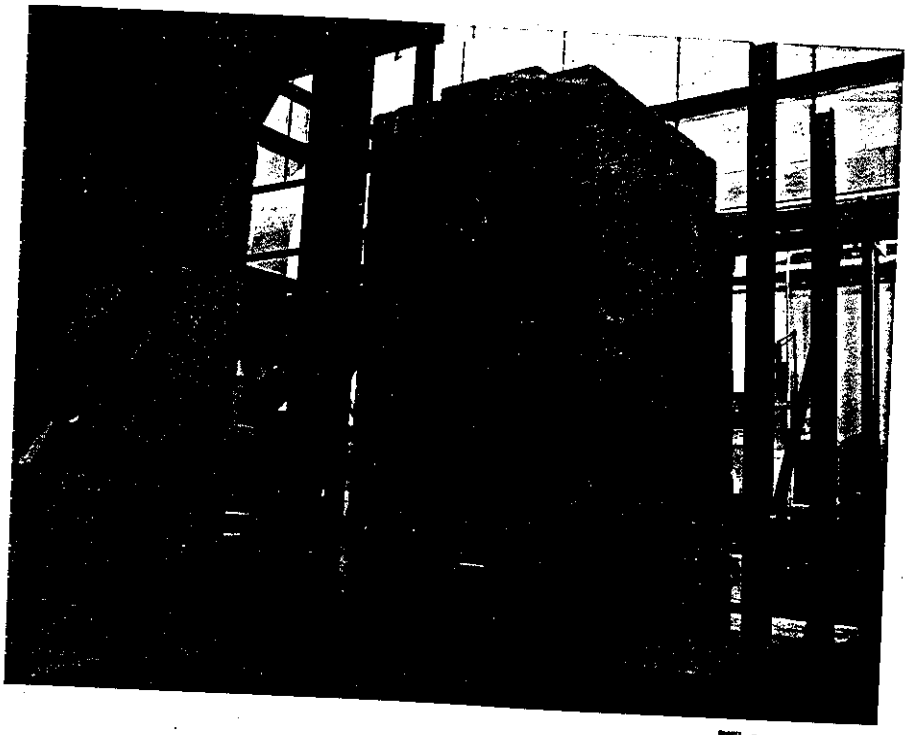
k>1 (4.20¢) @ 0.286"

53E vs 53H
+17.70¢ vs +4.20¢ = 13.50¢

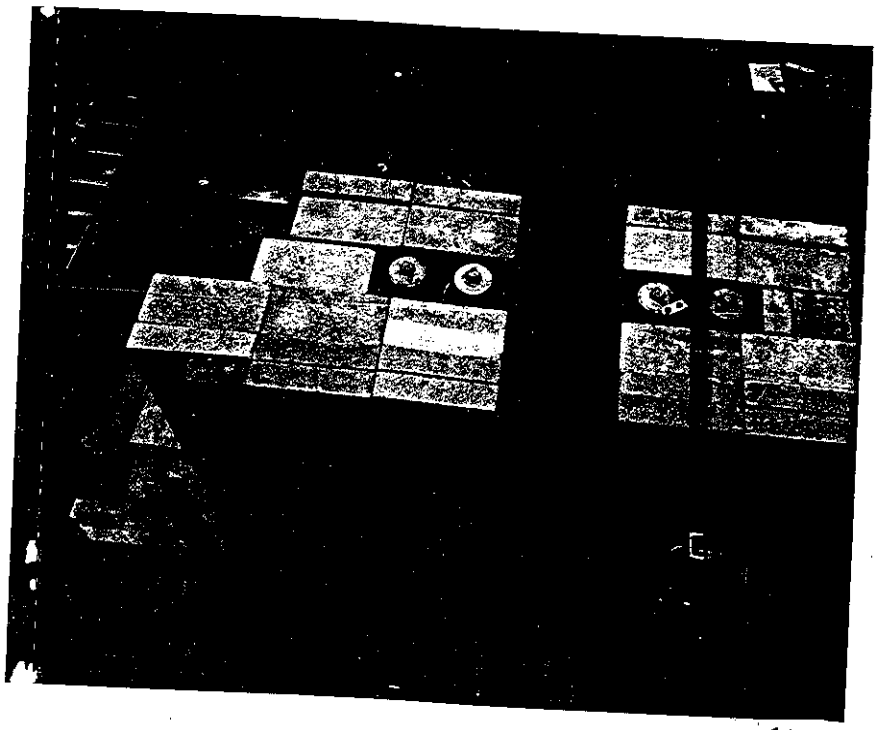
286 mils (.1908) = 54.56¢ + 4.2¢ = 58.76¢ calc closed

From the 12" NORTH Concrete:

∴ Remove 4" from N → North = 14.82¢
Remove 8" from N → North = 55.07¢ i.e. an additional ¢



53E



54D

NOTE: There is only 12" on South (Left) end. Only one brick was laying flat in view.

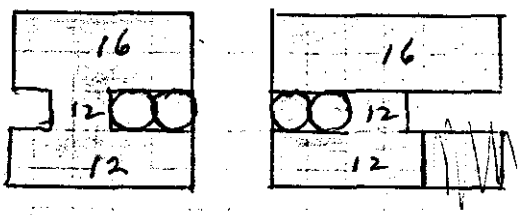
102 1 X 4 Array — Taylor & Lynn

Instrument Check on MAR 8 1974 Source ^{60}Co #20

PM-1 875 volts Low Trip SCRAM ok : Trip o/c

IC-1	3×10^{-10}	Meter Trip	OK	Fast Trip o/c
IC-2	3×10^{-10}	Meter Trip	o/c	Bldg Alarm
IC-3	10^{-9}	Calibration	o/c	A ok
IC-4	10^{-9}	Calibration	o/c	B o/c
Pen #113 - Neg Pwr; Area Cleared				C o/c

54A Remove cyl #437 Put others at contact.



Spacing Hg/Hg = 10.0 cm
& to & = 22.525 cm

cyls → 483-438 | 351-468

B=8, N=12, S=12, E=16, W=12, T=0 concrete reflected.

Super Critical (1 + 15¢) @ Table digit = 1.480
very rough est = ∓300 ¢ check

54B Make Cyl Spacing = 10.932 cm (Hg to Hg)
23.457 & to & cyl.

Refl same as above.

Super (1 + 15¢) @ Table digit = 0.920

k > 1 (1 + 15¢) @ 0.816"

54C Change cyl spacing to 2.203 cm (fly to fly)
cyl. ℄ to ℄ = 24.728 cm

	West	East	IC #3	IC #4
Pos (+)	.239	.232	+28.74 sec; +22.93¢	+26.42 sec; +23.86¢
∞	.335	.329		Avg +23.36¢
Neg (-)	.374	.369	−162.5 sec; −10.65¢	−157.9 sec; −11.10¢
				Avg −10.88¢

+ to ∞ = 96.5 mils = 23.30¢ = 0.241¢/mil @ ~ 184 position
∞ to − = 39.5 mils = 10.88¢ = 0.275¢/mil @ ~ 250 "

NOTE: This conf. has in addition to the refl. specified in Item #54A the following.
8" over the top of cylinde, #438. Also some small threaded patents on North & South ends.

℄ 21 (23.86¢) @ 0.132"
℄ ∞ @ 0.228"
℄ < 1 (10.88¢) @ 0.268"

54D (63) "Clean Up" above by removing item as per note. Record with Reflector as noted in Item # 54A.

	West	East	IC #3	IC #4
Pos (+)	.236	.231	+26.20 sec; +23.99¢	+27.35 sec + 23.40¢
∞	.324	.321		Avg 23.70¢
Neg (-)	.369	.366	−148.3 sec; −12.21¢	−145.9 sec; −12.51¢
				Avg 12.36
+ to ∞	= 89 mils	= 23.70¢	0.266¢/mil @ ~177	
∞ to −	= 45 mils	= 12.36	0.275¢/mil ~244	

See phot Pg 101

∞ to closed: 219.5 mil x 0.2336¢/mil from curve = +51.28¢

℄ 21 (23.70¢) @ 0.130"
℄ ∞ @ 0.219"
℄ < 1 (12.36¢) @ 0.264"

Instrument Check on MAR 12 1974 Source Taylor & Lynn 60 C #20

PR-1 875 Volts Low Trip O/C Trip SCRAM O/C

IC-1 3×10^{-10} Meter Trip O/C Point Trip O/K

IC-2 3×10^{-10} Meter Trip O/C Bldg Alarm

IC-3 10^{-9} Calibration O/C A O/C

IC-4 10^{-9} Calibration O/C 198°C B O/C

Rm #113 = Neg Rms; Area Cleared, t = ~~198°C~~, Cool C

54E (64) Add an 8" top to 54D.

	West	East	IC#3	IC#4	Avg
Pos (+) ∞ D	.326	.319	+89.81 sec; +10.49¢	+88.42 sec; 10.60¢	10.55¢
Neg (−)	.370	.365	−1107 sec; −1.19¢	−1204 sec; −1.08¢	−1.14¢

Pos & Neg = 45 mils = ¢ or 0. ¢/mil of table separation @ ± 24 mils

54D vs 54E = Value of Top 8" addition

(∞) vs + = 10.55¢

Neg vs Neg (slight) = 11.22¢

AVG = 10.89¢

264.5 mils & closed × (.2395 ¢/mil from curve) = +63.35¢

∴ 1 (10.55¢) @ 0.250"

1 (1.14¢) @ 0.255"

54F (65) Remove 4 from East wall.

∴ B=8", N=12", S=12", E 12", W=12", T=8"

	West	East	IC#3	IC#4	Avg
Pos (+) (∞)	.124	.113	+48.66 sec; +16.30¢	+50.08 sec +15.99¢	+16.15¢
	.194	.189	∞		
Neg (−)	.232	.227	−178.7 sec −9.33¢	−176.2 sec −9.51¢	−9.42¢

+ & ∞ = 74.5 mils = 16.15¢ = 0.217 ¢/mil @ ± 5 mil position

∞ & − = 38 mils = 9.42¢ 0.248 ¢/mil @ ± 110 mil

from D to closed = 88.5 mils × (.210 ¢/mil from curve) = +18.64¢

∴ 1 (16.15¢) @ 0.014"

1 ∞ @ 0.089"

1 (9.42¢) @ 0.132"

1 X 3 Array

TAYLOR & LYNN

Instrument Check on MAR 13 1974 Source 60 C#20

PM-1 875 Volts Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip SCRAM OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg. Alarm

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Run #113 = Neg Pres; t = 21.5°C; Area Cleared C OK

55A (66) Remove Cyl # 483

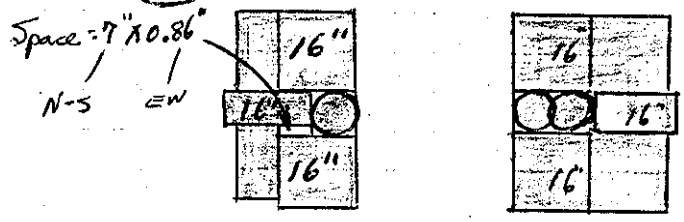
∴ cyls: 438 351 468

cyl. @ contact (fig)

R to ℄ = 22.525 cm

Spacing = 0.0 (fig)

cyl-conc = contact (fig)



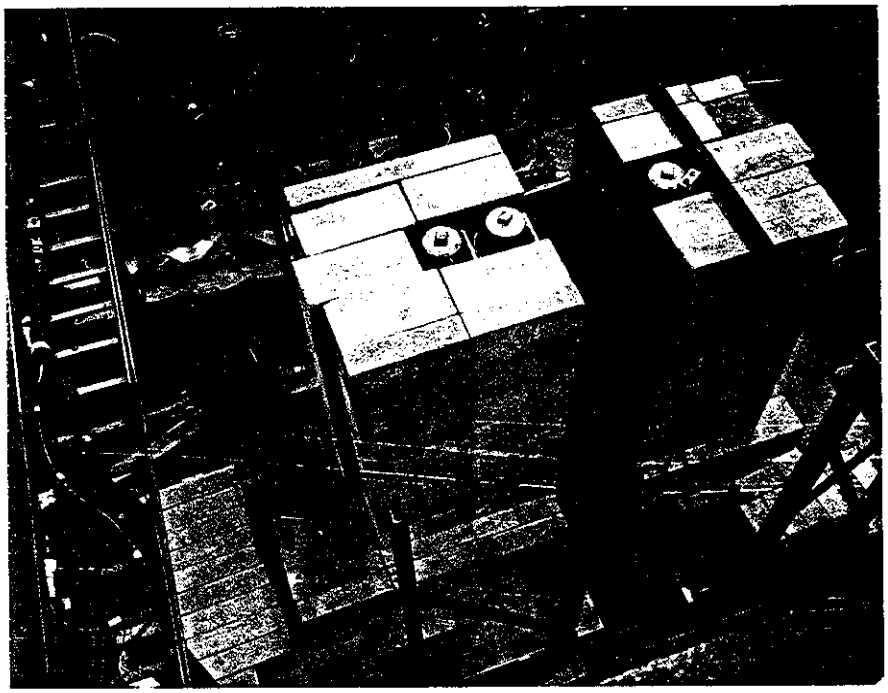
B = 8", N = 16", S = 16", E = 16", W = 16", T = 8" on North table only

Run #	BF_3 (A) (cpm)	IC #2 Scale	IC #2 Run	South Concrete (B)	IC #4	Top Refl. 8"	Table Sep (IN)	Plexi Thick. (cm)	Ex to ℄ (cm)
55A	9270	10×10^{-11}	.85	0	0.0036	N-only	53.0	0.0	22.525
	14760	10×10^{-11}	5.1	0	0.062	" "	.040	0.0	"
55B	9494	10×10^{-11}	.8	1.5	0.0040	" "	53.0	0.635 (A)	23.160
	19086	3×10^{-10}	.85	1.5	0.11	" "	.040	"	"
55C	9600	10×10^{-11}	.85	0	0.0039	" "	53.0	"	"
	48870	10×10^{-10}	3.3	0	0.40	" "	.040	"	"

(A) 1/4" x 8 3/4" x 44 1/2" plexi between [438 & 351] & [351 & 468]

(B) Spacing of South end concrete from cyl. flange,

IC #2 & #4 placed alongside of West concrete.



55H

Taylor & Lynn

Instrument Check on MAR 14 1974 Source 60Co #20

PM-1 875 Volts Low Trip OK High Trip OK

IC-1 3×10^{-10} Meter Trip SCRAM OK Fast Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarms

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Rm #113 Negative; t = 20°C; Area Cleared C OK

55D Remove plexi (ref 55c)
add plexi .450" x 8 3/4" x 48" Plexi = 1.143cm
$\ell - \ell$ = 23.668cm

	West	East	IC #3	IC #4	Avg
Pos (+)	.283	.288	+17.99 rec; +29.55°	+19.21 rec; +28.48°	+29.02°
∞	.368	.374			
Neg (−)	.407	.414	−145.8 rec; −12.18° = 150.2 rec; −11.98°		−12.08°

+ to ∞ = 85.5 mils = 0.339°/mil @ ≈ 220 position
∞ to − = 39.5 mils = 0.304°/mil @ ≈ 285 position

k > 1 (29.02°) @ 0.183"
k ∞ @ 0.268"
k < 1 (12.08°) @ 0.303"

55E (67) Same as above but add the remaining 8" top.
∴ B = 8", N = 16", S = 16", E = 16", W = 16", T = 8"
ℓ to ℓ cyl = 23.668 cm

	West	East	IC #3	IC #4	Avg
Pos (+)	.317	.325	+40.23 rec; +18.47°	+40.17 rec; 18.49°	+18.48°
IC (∞)	.371	.380			
Neg (−)	.405	.414	−153.2 rec; −11.74°	−153.8 rec −11.54	−11.64°

+ to ∞ = 50.5 mils = 18.48° = 0.366°/mil @ ≈ 240
∞ to − = 34 mils = 11.64° = 0.342°/mil @ ≈ 285

272.5 mils (from curve x .3070°/mil) = 83.66°

k > 1 (18.48°) @ 0.218"
k ∞ @ 0.273"
k < 1 (11.64°) @ 0.307"

55F Remove 4" concrete from West Side.

B=8"; N=16"; S=16"; E=16"; W=12"; T=8"

	West	East	IC #3	IC #4	Avg
Pos (+)	.197	.204	+37.58 sec; +20.32¢	+34.07 sec; +20.52¢	+20.42¢
IC (∞)	.264	.271			
Neg (−)	.289	.297	−188.1 sec; −8.70¢	−180.3 sec −9.21	−8.96¢

k>1 (20.42¢) @ 0.095"
k∞ @ 0.165"

+W ∞ = 67 mils = 20.42¢ = 0.305¢/mil @ ≈ 128 position
∞ W − = 25.5 mils = 8.96¢ = 0.351¢/mil @ ≈ 175 position

164.5 mils (from curve 0.2915¢/mil) = 47.95¢
k<1 (8.96¢) @ 0.165"

55G Remove 4" concrete from East side

(69) B=8"; N=16"; S=16"; E=12"; W=12"; T=8"

	West	East	IC #3	IC #4	Avg
Pos (+)	.132	.137	+240.4 sec; +4.64	+241.5 sec; +4.62	+4.63¢
IC (∞)	.144	.155			
Neg (−)	.159	.166	−495.3 sec; −2.84¢	−506.5 sec; −2.78¢	−2.81¢

+W ∞ = 17.5 mils = 4.63¢ = 0.264¢/mil @ ≈ 38 position
∞ W − = 10.5 mils = 2.81 = 0.268¢/mil @ ≈ 50 position

49 mils (from curve 1.259¢/mil) = 12.69¢ @ closed
k>1 (4.63¢) @ 0.032"
k∞ @ 0.049"
k<1 (2.81¢) @ 0.060"

55H Remove 8" top — Chita Pg 106

(70) B=8"; N=16"; S=16"; E=12"; W=12"; T=0

	West	East	IC #3	IC #4	Avg
Pos (+)	.102	.106	+77.97 sec; 11.45¢	+78.73 sec; 11.59¢	+11.52¢
IC (∞)	.142	.147			

+W ∞ = 40.5 mils = 11.52¢ = 0.284¢/mil @ ≈ 20
k>1 (11.52¢) @ 0.001"
k∞ @ 0.042"

1 (25¢ from curve) = 0.25 + 11.52 = 11.77¢ @ closed

556 vs 55H = 0.92¢ value TOP

1 X 2 ARRAY

Instrument Check on MAR 15 1974 Sources Taylor & Lynn 60Co #20

PM-1 875 volt Low Trip O/C Trip O/C

IC-1 3×10^{-10} Meter Trip OK Fast Trip SCRAM O/C

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm

IC-3 10^{-9} Calibration OK A OK

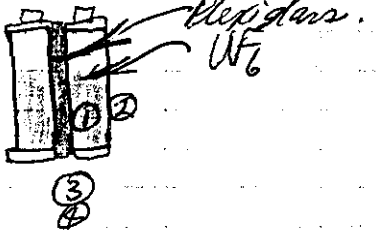
IC-4 10^{-9} Calibration O/C B O/C

Rm #113 - Neg Press; Area Cleaned t: 20°C C OK

56A Remove #468 ∴ (438) (351)

Run #	Table Sep. (In)	IC #2 (10×10^{-11})	IC #4 (chart)	Reflector (In) B T N S E W	Plexiglass TH.	WD.	HT	BF_3A cpm	No. of Min. CB.
56A	53.0	0.6	.0023	8 0 16 16 12 12	.450	8 3/4	52	4550	2
	0.0	1.7	.0125					4770	2
B	53.0	0.6	.0023		.980	7 13/16	48	4913	2
	0.0	1.7	.0125					4640	2
C	53.0	0.6	.0023		1.96	7 13/16	48	5453	2
	0.0	1.3	.0092					6194	2

① IC #2 @ surface of West concrete
② IC #4 @ surface of West concrete
③ BF_3(A) West side 10" above 113 floor.
④ BF_3(B) West side 3' above 113 floor.



Taylor & Kynn

Instrument Check on MAR 18 1974 Source 60 Co # 20

PS-1 875 VOLTS Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Test Trip OK

IC-2 3×10^{-10} Meter Trip SCRAM OK

IC-3 10^{-9} Calibration OK

IC-4 10^{-9} Calibration OK

Rm # 113 : Dig Pwr ; Area Cleared

Bldg Alarm
A OK
B OK
C OK

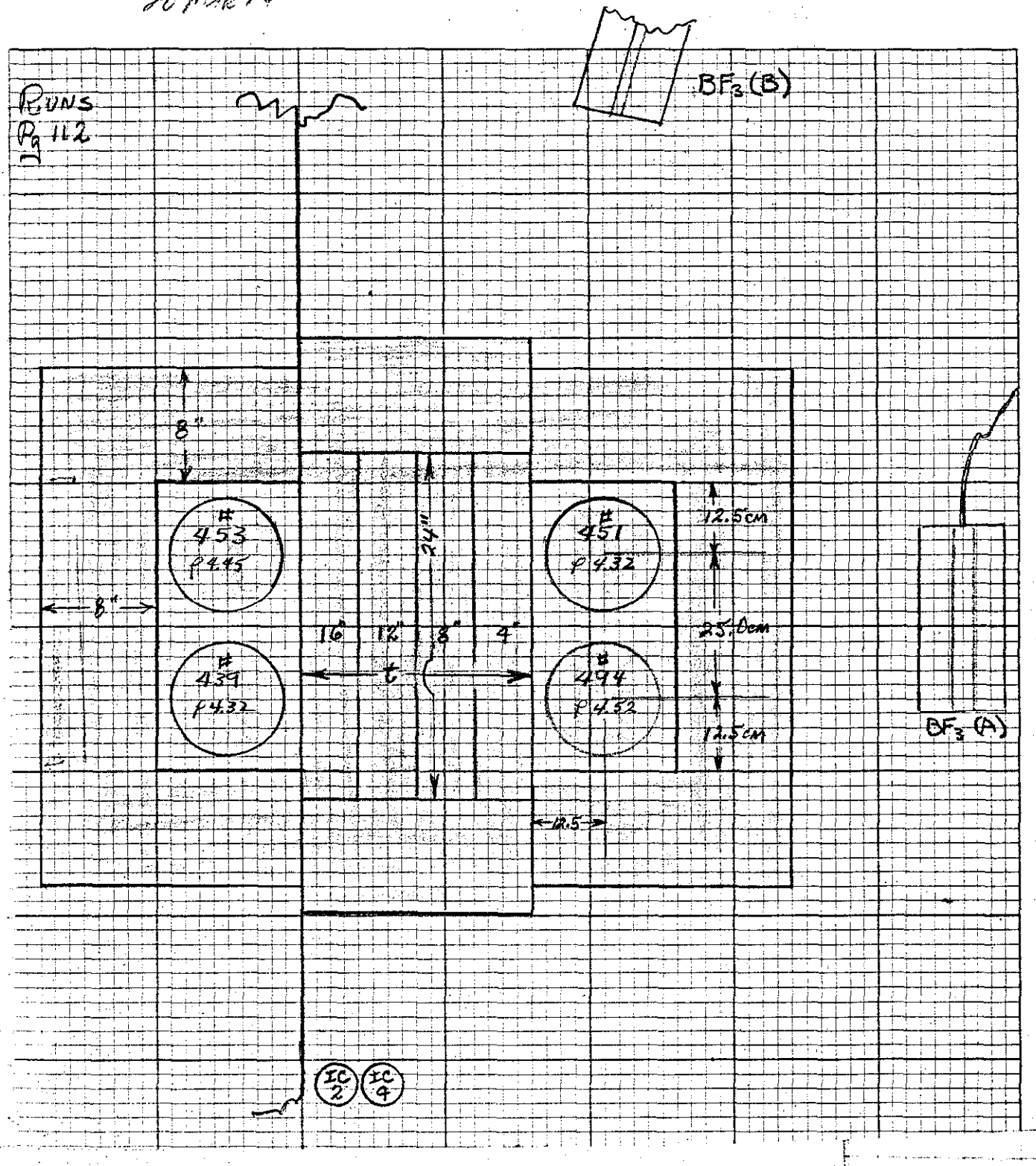
Run #	TABLE SEP. (cm)	IC #2 (10×10^{-11})	IC #4 hundchart	BF3 (A) CPM	BF3 (B) (CPM)	CONCRETE REFLECTOR (cm) B T N S E W	PLEXIGLASS THICKNESS * CENTERED BETWEEN CYL (cm)	cyl # & t (cm)	
56D	53	0.55	.0026	10146	1667	8 0 16 16 12 12	4.98	27.505	
	0	1.3	.0095	10179	1744				
56E	53	0.50	.0019	10180	1717	8 0 16 16 16 16	4.98	27.505	IC #2 ↓ moved slightly over
	0	1.0	.0063	10041	1682				
56F	53	0.5	.0019	10171	2271		3.63	27.505	
	0	1.05	.0069	10075	2319				
56G	53	0.5	.0019	3097	375		4.27	27.505	Reorient ctrs stored away from cyls
	0	1.0	.0066	5594	481				
56H	53	.5	.0019	—	—		4.98	27.505	
	0	.98	.0065	5439	451				
56I	0	1.05	.0069	5670	517		3.12	27.505	
56J	53	.5	.0019	3169	428		2.49	27.505	
	0	1.02	.0068	5651	478				
56K	0	1.0	.00625	5390	462		1.14	27.505	

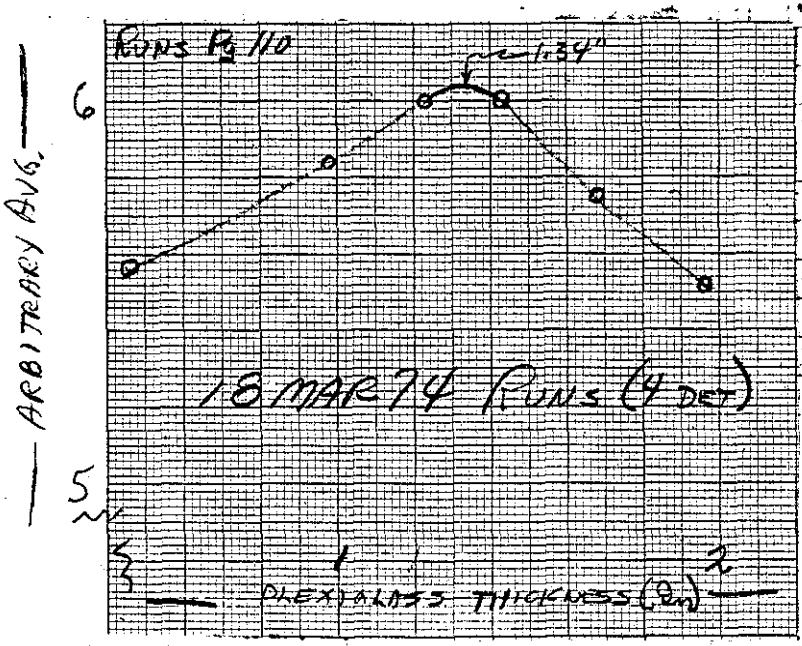
SEE Plot TOP Pg 111

$\frac{IC2 \times 6 + IC4 \times 1000 + A \div 1000 + B \div 100}{4}$ = arb.

* Width = ≃ 20.2 cm ℄ HT = ≃ 122 cm.

30 Mar 74


RUNS
Pg 112
BF3 (B)
8"
#453
P445
8"
#439
P432
16"
12"
8"
4"
24"
t
#451
P432
#494
P432
12.5cm
25.0cm
12.5cm
12.5
BF3 (A)
IC 2
IC 4


RUNS Pg 110
1.34"
6
5
ARBITRARY AVG.
18 MAR 74 RUNS (4 DET)
1
2
PLEXIGLASS THICKNESS (2in)

Taylor & Lynn

Instrument Check MAR 20 1974 Source 60Co #20

FM-1 875 volts Low Trip SCPM ok Trip OK

IC-1 3x10-10 Motor Trip OK Past Trip OK

IC-2 3x10-10 Motor Trip OK

IC-3 10-9 Calibration OK

IC-4 10-9 Calibration OK

Run #113 = Neg Pwr Area Cleared

Bldg Alarms
A OK
B OK
C OK

See Drawing Pg 111

RUN #	TABLE SEP. (IN)	CONCRETE REFLECTOR BTNSEW t*	BF_3 A (CPM)	BF_3 B CPM.	IC2 (10x10-11	IC4 chart
57A	53	8 8 8 8 8 8 0	8253	1138	0.50	.0020
	0		15242	1533	0.85	.0058
57B	53	8 8 8 8 8 8 4	13275	1302	0.60	.0030
	0		21204	1804	0.95	.0072
57C	53	8	15907	1372	0.60	.0034
	0		22718	1895	1.00	.0075
57D	53	12	16987	1426	0.63	.0038
	0		21757	1684	1.00	.0075
57E	53	16	16820	1457	0.60	.0038
	0		20440	1636	0.95	.0070

* see drawing pg 111

Instrument Check on MAR 21 1974 Source 60Co #20 NRT & JAH 113

PM-1 875 Volts Low Trip OK : Trip SCRAM OK

IC-1 3×10^{-10} Meter Trip OK Test Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

RM #113 = t = 21.5°C C OK

Area Cleared

57E Same conf as 57E EXCEPT - there is no spacing - all items are in contact.

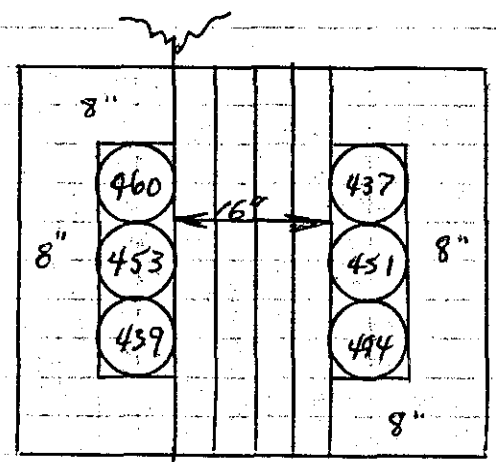
∴ ℄ to ℄ cyl = 22.525 cm

8" concrete eff. on all sides (6)

16" concrete between cyl on MOVABLE & STAT. TABLE.

table Sep	IC #2	IC #4	BF3 A (cpm)	BF3 (B) cpm
53 in.	0.68	.0050	23939	1922
0 in.	1.20	.0105	32723	2703

58A (71)



ADD 2 cylinders IC # 460 & #437

* NORTH-SOUTH → ℄ to ℄ = 63.17 cm

EAST-WEST → ℄ to ℄ = 22.525 cm

[8" concrete on 6 sides & 16" in centers

* IF Table were closed

	West	East	TABLE Sep.	IC #3	IC #4	AVG
Pos (+)	.988	.990	.887"	+83.08 sec; +11.12¢	84.64 sec; +10.96¢	+11.04¢
DC (∞)	1.077	1.080	.981"	∞	∞	∞
Neg (−)	1.127	1.130	1.027"	−270.4 sec; −5.52¢	−275.4 sec; −5.40¢	−5.46¢

+ to ∞ = 94 mils = 11.04¢ = 0.117¢/mil

∞ to − = 46 mils = 5.46¢ = 0.119¢/mil } 0.118¢/mil

Taylor & Lynn.

Instrument Check on MAR 22 1974 Source _____

MAR 22 1974 Low Trip O/C Trip O/C

IC-1	3×10^{-10}	Meter Trip	SCRAM O/C	Fast Trip	O/C
IC-2	3×10^{-10}	Meter Trip	O/C	Bella Alarm	
IC-3	10^{-9}	Calibration	O/C	A	O/C
IC-4	10^{-9}	Calibration	O/C	B	O/C
Rm #113; Deg Press; t = 21°C		Area Cleard		C	O/C

58B (72) Remove 4" from North side of the 16" section in the center. i.e. now have 12" concrete

	West	East	Table Sep	IC #3	IC #4	Avg
Pos(+)	1.273	1.281	1.177"	+42.89sec; +12.72#	+43.95sec; +17.44#	+17.58#
DC(∞)	1.489	1.496	1.393"			

+ to ∞ = 216 mils or 0.0814#/mil

58C (73) Remove 4" more ic, now have 8" concrete in center still abating South cylinders.

	West	East	Revolutions	table Sep	IC #3	IC #4	Avg
Pos(+)	1954	1960	21.55	1.857"	+59.53sec +14.19#	+59.05sec +14.27#	+14.23#
D∞			22.95	2.037"			

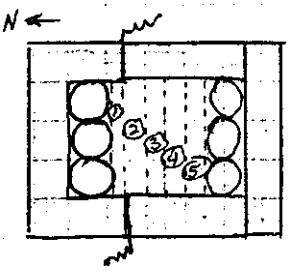
180 mils : 14.23# = 0.0791#/mil

58D (74) Remove 4" more ic now have 4" —

	West	East	table Sep	IC #3	IC #4	Avg.
Pos(+)	.402	.408	0.305"	+68.54sec; +13.34#	+67.40sec; 12.99#	+13.17
DC(∞)	.514	.520	0.417"			

112 mils = 13.17# = 0.118#/mil

58E Spread cyl. 4" more apart: N-S i.e



Dist. are located as Pg 111

cyl. # to # (North South if closed) = 73.325cm
East West = 22.525cm
→ 8" concrete (6 sides) + section ④ & ⑤ filled with concrete. I = 8"
→ Section ① ② ③ : VOID.

Run	West	East		IC 2	II #4	BF_3(B) (ppm)
58E	.101	.103	closed	3×10^{-10} (2.2)	0.265	59950
58F	Section ③ ④ & ⑤ filled. # ① ② are void					
	—	—		3×10^{-10} (0.98)	0.115	29427
58G	Sections ② ③ ④ ⑤ are filled. Section ① is void.					
				3×10^{-10} (0.45)	0.060	15967
58H (79)	all sections filled—					
	.230	.238		~~3×10^{-10} (0.45)~~	~~0.060~~	~~15967~~ NRT
	concrete is together table lacks 0.132"			10×10^{-11} (7.6)	.085	26945
	table @ 53"			3×10^{-10} (0.18)	.022	5973
				10×10^{-11} (1.7)		

Taylor & Lynn.

Instrument Check on MAR 25 1974 Source ^{60}Co #20

PM-1 875 Volts Low Trip OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Rate Trip 5000 cpm e/c

IC-2 3×10^{-10} Meter Trip OK Bldg Alarm

IC-3 10^{-9} Calibration OK A ok

IC-4 10^{-9} Calibration OK B ok

Rm #113 = Neg. Press. t = 20.5°C C ok

58 I Repeat 58H

	IC #2 (10×10^{-11})	IC #4	BF_3 (B) cpm
table @53"	1.4	0.021	6010
table @70" (70 mils) equivalent	7.9	0.094	29625

58 J Add 4" concrete to North side. N = 12"

@53"		1.45	0.0215	6364

	West	East	table Sep	IC #3	& IC #4	Assy
Pos. (+)	.184	.190	.085"	+257.5 sec (+4.36 q)	+280.5 sec (+4.04 q)	+4.20 q
DC (∞)	.245	.248	.145"			∞
Neg (−)	.294	.297	.194"	−404 sec (−3.49 q)	−405 sec (−3.48 q)	

+ to ∞ = 60 mils = 0.070 q/mil

∞ to − = 49 mils = 0.071 q

85 mils × (.070 q/mil) = 5.95 q + 4.20 q = Closed +10.15 q

→ use 58K

58K (80)

Repeat 58J after slight concrete adjustment

i.e. 8-8 = 12 - 8-8
B-T - N - S-E-W

	West	East	table Sep	IC #3	IC #4	Avg.
Pos (+)	.178	.186	.080"	+200.0 sec; +5.45#	+195.1 sec; +5.57#	+5.51#
DC (∞)	.254	.259	.155			∞

75 mils = +5.51#; or 0.073 #/mil

80 mils x (.071 #/mil) = 5.68# + 5.51# = closed +11.19#

58L (81)

[redacted] Add 4" to South Side.

table Separation [redacted]

	(Converge)	(Fini) Row Line Sep	IC #3	IC #4
Pos (+)	2.5"	25.05 rev. (2.40")	+81.50 sec (+11.33#)	+84.36 sec (+11.00#)
∞	2.85"	28.15 rev. 2.90"		11.17# Avg.
Neg. (−)	3.0	30.05 rev. 3.20"	+24.46 sec (-6.24#) - 23.42	(-6.57#)

(+) to (∞) = 0.500" = 11.17# = 0.0223 #/mil
(∞) to (−) = 0.300" = 6.57# 0.0219 #/mil

$\left(\frac{.071 + .022}{2}\right)$ #/mil est x 2900 = 135# Very Rough Est.

∴ One 4" wall on South = ± 124# or more.

118

MAR 26 1974

Instrument Check on _____ Source 60C #20

Taylor & Lynn.

PM-1 875 volts Low Trip SCRAM OK Trip OK

IC-1 3×10^{-10} Meter Trip OK Fact Trip OK

IC-2 3×10^{-10} Meter Trip OK Bldg Alarms

IC-3 10^{-9} Calibration OK A OK

IC-4 10^{-9} Calibration OK B OK

Run #113 = Neg Press Area cleaned C OK

Had Photo's made of 58 L JET with top (from side and Top off (from above).

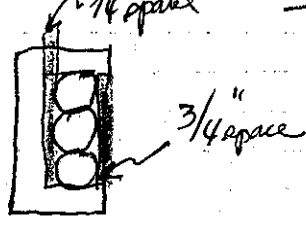
58 M JET (75) Repeat #58A 8-8-8-8-8-8 # 16 in centers

	West	East	table Sep	IC#3	IC#4	Asy
Pos (+)	.987	.991	0.887"	+91.9 sec; ↑10.30¢	91.6 sec; ↑10.33¢	+10.32¢
~~Pos~~ ∞	1.072	1.076	0.972"			∞
Neg (-)	1.127	1.130	1.027"	-245.8 (-6.20¢)	-228.7 (-6.37¢)	-6.49¢

(+) to (∞) = 55 mils = 10.32¢ = 0.121¢/mil > 0.119¢/mil

(∞) to (-) = 55 mils = 6.49¢ = 0.118¢/mil

58 N JET (76) Move North table UF_6 cyl's back (north) yard 3/4" and move North end concrete so there is 3/4" void between it and UF_6. South table same as ~~58A~~ 58M.

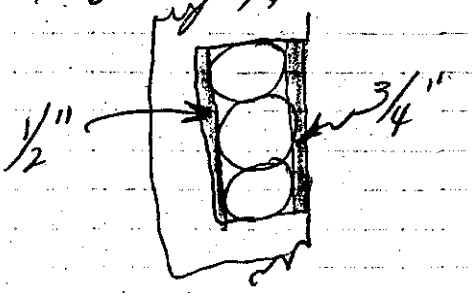


	#2	#4	B (gm)	
@53"	10×10^{-12}	2.8	.0032	5611
0"	10×10^{-11}	6.3	.097	292,000

Sat but "near"

58 VET (77) Move North end conc. toward the UF6 by 1/4"

∴

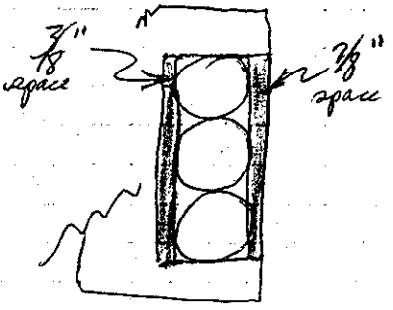


	West	East	table Sep	IC #3	IC #4	Avg
Pos (+)	.101	.107	0.0"	+125sec; +8.08	123sec; +8.17¢	+8.13¢
DC ∞	.185	.193	0.085"			∞
Neg (−)	.225	.233	0.125"	−393.0sec −3.60¢	−382.4sec −3.70¢	−3.65¢

+ to ∞ = 85 mils = 8.13¢ = 0.0956¢/mil
∞ to − = 40 mils = 3.65¢ = 0.0913¢/mil

58 ~~GF~~ P VET (73) Move North cyls. Northward 1/8"

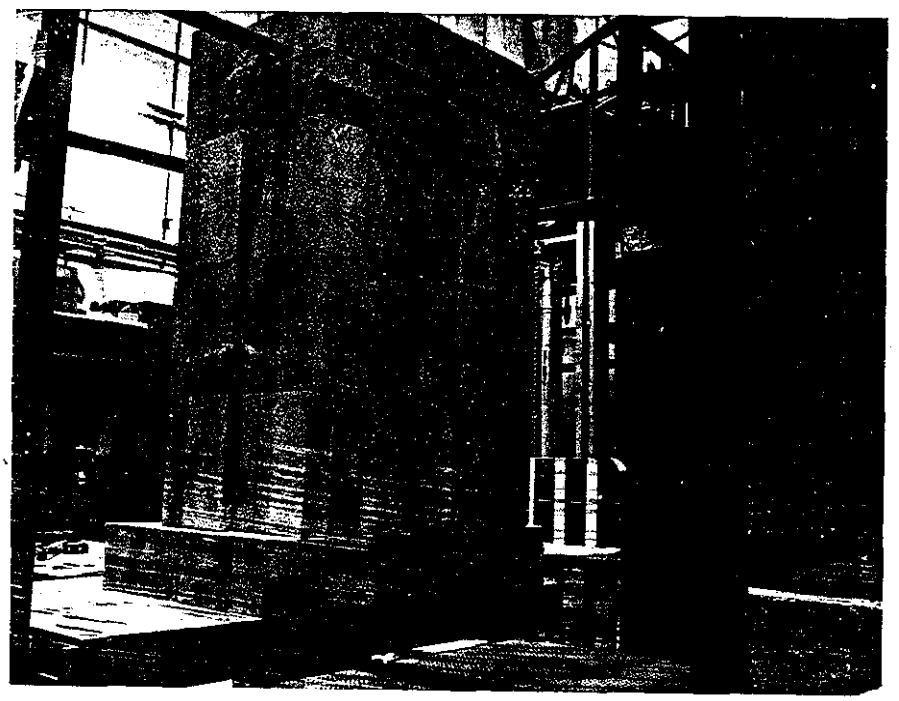
∴



	West	East	table Sep	IC #3	IC #4	Avg
Pos (+)	.101	.107	0.0"	+221.1sec 4.98¢	+212.1sec 5.18¢	+5.08¢
∞	.151	.160	0.052"			∞

+ to ∞ = 52 mils = 0.098¢/mil

58A



58A

HP's
report of 1st
Quarter of 1974
for C.C., DJ2, & DPT
Security Badge ie

NON-RECORD FILM DATA (NTA)

REQUESTER Edy

ADDRESS

REMARKS

UCN-8378 (3 10-67)

ITEM	LOCATION	IDENT. NO.
Cross		60450

TRACKS	SCANS	TRACKS/SCAN
2	5	

CALIBRATION FACTOR: _____ TRACKS/SCAN PER MILLIREM

DOSE EQUIVALENT THIS FILM: 20 MREM

NOTE: 1 Star track

NON-RECORD FILM DATA (NTA)

REQUESTER

ADDRESS

REMARKS

UCN-8378 (3 10-67)

ITEM	LOCATION	IDENT. NO.
Taylor		60444

TRACKS	SCANS	TRACKS/SCAN
5	5	

CALIBRATION FACTOR: _____ TRACKS/SCAN PER MILLIREM

DOSE EQUIVALENT THIS FILM: 50 MREM

NOTE:

NON-RECORD FILM DATA (NTA)

REQUESTER

ADDRESS

REMARKS

UCN-8378 (3 10-67)

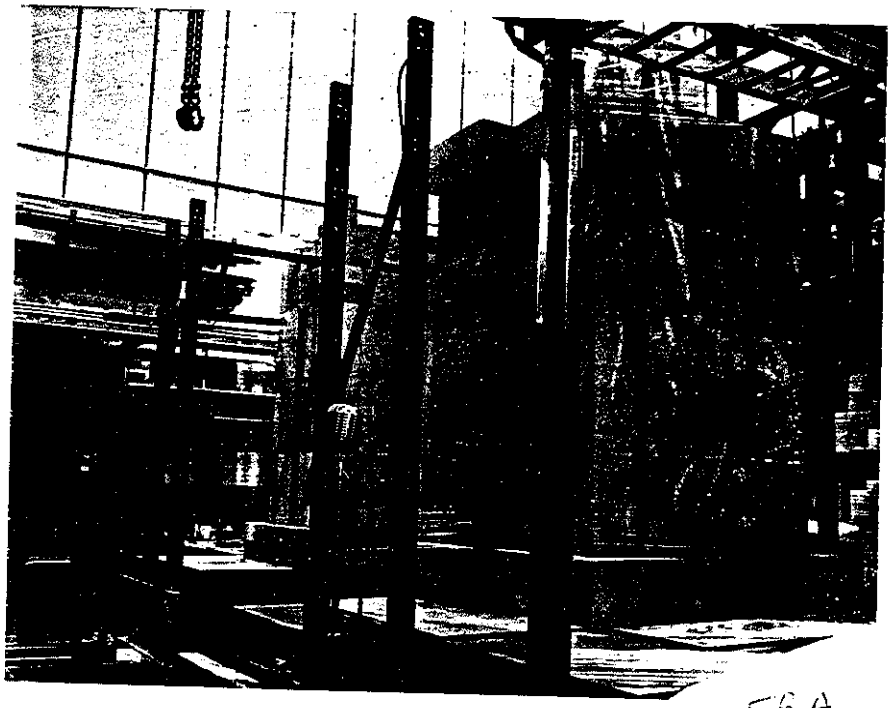
ITEM	LOCATION	IDENT. NO.
Lyon		60457

TRACKS	SCANS	TRACKS/SCAN
2	5	

CALIBRATION FACTOR: _____ TRACKS/SCAN PER MILLIREM

DOSE EQUIVALENT THIS FILM: 20 MREM

NOTE: 1 - Star Track



56A

4 x 8 x 16 in. (nom.) Concrete Blocks
Random Samples (2 Apr 74) - JRT

Sample	Weight (kg)	Width (cm)	Thickness (cm)	Length (cm)	ρ (g/cm^3)
1	18.090	20.45	10.18	40.50	2.146
2	17.515	20.54	10.17	40.62	2.064
3	17.880	20.42	10.15	40.60	2.125
4	17.600	20.74	10.20	39.40	2.112
5	17.960	20.60	10.32	40.65	2.078
Avg →	17.809	20.55	10.20	40.35	2.105
± →	0.109	0.06	0.03	0.24	0.015

166

GOODYEAR ATOMIC CORP-DM-1226

48" High

STEEL	8.035" I.D.	WALL 0.1800"
MONEL	8.000	0.1875
NICKEL	8.000	0.1875

"STEEL" ARRAYS ARE MORE REACTIVE, BY ABOUT 6%.

250°C would occupy ≥ 90 ± 3% of cyl. vol.
4×10^{17} to obtain same
Lithium = ≈ 133 times greater than metal.

8.427" Dia @ 20"
67.245 circ @ 20"

Condensed Data – Work Sheets Only!

Independent Estimations of UF_6 Heights in Cylinders

Cylinder Number	Original JRT & JJL	JJL	JRT	ERR	RKR	(") Height Average	Height Average (cm)	Mass (kg)	Volume (cm^3)	ρ (g/cm^3)	$a_o + b_o X$ (g/cm^3)
460	30.0	26.5	29.5	--	28.0	28.5	72.39	108.024	23,476	4.60	4.60
492	34.5	33.5	33.0	31.5	32.5	33.0	83.82	109.589	27,182	4.03	4.11
462	40.5	39.5	40.8	41.5	40.8	40.6	103.12	109.884	33,441	3.28	3.38
483	31.5	34.5	30.5	29.5	32.0	31.6	80.26	110.043	26,028	4.23	4.26
494	29.5	26.5	30.5	--	30.5	29.3	74.42	110.178	24,134	4.57	4.52
491	33.5	32.5	33.5	33.0	34.0	33.3	84.58	110.178	27,429	4.02	4.08
485	40.5	38.5	38.5	37.0	38.5	38.6	98.04	110.451	31,794	3.47	3.50
437	31.5	33.0	31.5	32.2	31.2	31.9	81.03	110.610	26,278	4.21	4.23
439	--	--	--	--	--	--	--	110.904	--	--	4.32
451	33.5	28.5	31.0	--	31.5	31.1	78.99	110.904	25,616	4.33	4.32
475	33.5	32.5	32.5	--	33.5	33.0	83.82	111.313	26,981	4.13	4.11
351	33.5	32.5	33.5	31.0	34.5	33.0	83.82	111.494	27,182	4.10	4.11
453	30.5	29.5	29.0	29.0	31.5	29.9	75.95	111.562	24,630	4.53	4.45
438	33.5	--	34.5	31.0	35.5	33.6	85.34	111.993	27,675	4.05	4.05
468	36.5	34.5	35.5	34.5	36.0	35.4	89.92	112.242	29,160	3.85	3.85
423	38.5	38.5	37.5	38.5	41.5	38.9	98.81	113.353	32,043	3.54	3.46

Average: 4.084
(new 5 readings average)

3.987 (old original

(ΣX^2) = 109,302.67 $\quad \Sigma xy$ = 5127.49
ΣX = 1,274.31 $\quad \Sigma y$ = 60.94
$(\Sigma X)^2$ = 1,623,865.98

BARE & POLY REFLECTED

Run	Reflector	Array		Flange-to-Flange (cm) Spacing	(cm) ℄ to ℄	(¢) Reactivity at Closure	¢/mil	Derived from Estimates from Radiographs ρ	Height (cm)
8	Bare	2 x 8	Subcritical	0	22.525	--	--	3.993 ← may change this	86.36
9	Bare	3 x 3	Subcritical	0	22.525	--	--	3.890	88.76
22	Bare	3 x 4	Super	0.287	22.812	26.32	0.366	3.981	86.57
32	Bare	4 x 4	Super	2.403	24.960	25.96	0.195	3.993	86.36
35f	Bottom only Poly (1)	1 x 12	Subcritical	0	22.525	--	--	4.038	85.20
36e	Bottom and one side (2)	1 x 13	Subcritical	0	22.525	--	--	4.071	84.41
37e	Bottom and two sides (3)	1 x 13	Subcritical	0	22.525	--	--	4.071	84.41
38a	Bottom and four sides (5)	2 x 2	Subcritical	0	22.525	--	--	3.990	86.36
38h	Bottom and four sides (5)	2 x 2	Super	2.613* ✓ 2.772	25.137	76.4	0.329	3.990	86.36
	*Between cylinder-to-cylinder flanges only is 2.454 cm mod (Plexi) and 0.159 cm spacing Tw/Al								
39i	Five Sides (5)	3 x 3	Super	3.569	26.094	22.65	0.187	4.083	84.11
40c	Five sides (5)	4 x 4	Super	6.668	29.192	26.66	0.147	3.993	86.36
40m	Six sides (6)	4 x 4	Subcritical	7.066	29.591	-10.53	0.144 [redacted] 0.116	3.993	86.36
	But measured using mod. "In and Out"						0.130 <		

Evaluate (on corner) diff. of No. 460 and No. 423 = Run 25 vs 26 = 35.41¢; No. 460 is greater by 35.41¢ 460 = 101.25 kg and ρ = 4.412 (4.4124) 423 = 113.59 kg and ρ = 3.514 (3.514 ✓)

Evaluate 10 in. of top of all vertical sides on North only = 40c vs 40d = 24.19¢
Evaluate 1/2 of full top reflector = Run 40d vs 40e = 34.76¢.
Evaluate 0.625 cm steel on table = Run 32 vs 33 vs 34 = 59.4¢.

4 x 4 @ 6.668 cm spacing calc to closure = +96¢ using 40c → 40e
26.66¢ + 34.76¢ (2) = 96.18¢

64 diam meas. = 22.525 cm ± 0.003 cm "weighted tape" → $\sigma_m = \sqrt{\frac{\Sigma_{wi}\,(Xi - \bar{x})^2}{\Sigma_{wi}\,(n-1)}}$

64 diam meas. = 22.525 cm ± 0.020 cm "unweighted tape" → ??

16 cyl. ρ max. diff. = 4.465 to 3.303 g/cm^3
16 cyl. average: ρ = 3.993 g/cm^3

height = 86.36 cm
height = 34.0 in.
Mass = 111.027 kg
Mass = 244.259 lbs.

UF_6 Cylinder Information

Cylinder Number	Height (in.)	Weight UF_6 (lb)	$\rho(UF_6)^a$ (g/cm^3)
453	30.5	243.90	4.449
438	33.5	246.90	4.067
485	40.5	243.50	3.318
462	40.5	242.25	3.301
494	29.5	242.90	4.544
423	38.5	249.90	3.582
491	33.5	242.90	4.001
451	33.5	244.50	4.028
439	32.5	244.50	4.151
351	33.5	245.80	4.049
483	31.5	242.60	4.250
468	36.5	247.45	3.741
460	30.0	238.15	4.381
437	31.5	243.85	4.272
475	33.5	245.40	4.042
492	34.5	241.6	3.864
		$\bar{\rho}$	4.0025 ± 0.09186
		$\bar{\rho}$	$2.694\ g/cm^3$

Avg. weight 244.25625 ± 0.68031708 lb

Units Tape → 244.13125 ± 0.671697

a. Based on 8 in. i.d. for cylinder.

From Low ρ to High ρ	Numerically	UF_6 Estimated Height (cm)	(in.)	Calculated ρ (g/cm^3)
462	351	85.09	33.5	4.043
485	423	97.79	38.5	3.514
423	437	80.01	31.5	4.254
468	438	85.09	33.5	4.043
492	439	82.55	32.5	4.149
491	451	85.09	33.5	4.043
451	453	77.47	30.5	4.359
475	460	76.20	30.0	4.412
351	462	102.87	40.5	3.303
438	468	92.71	36.5	3.726
483	475	85.09	33.5	4.043
437	483	80.01	31.5	4.254
439	485	102.87	40.5	3.303
460	491	85.09	33.5	4.043
453	492	87.63	34.5	3.937
494	494	74.93	29.5	4.465

Linear Array, Concrete Reflected Composite Basic Summary.

Run No.	No. of Cylinders	B	W	S	E	N	T	Cylinder ℄ to ℄ (cm)	Spacing[a] Between Cylinder Flange	Reactivity at Closed or Calculated to Closed
50B	11	8	0	0	8	0	0	22.525	0.0	Sub
D	13	8	0	0	12	0	0	22.525	0.0	Sub
F	13	8	8[b]	0	12	0	0	22.525	0.0	≃ + 85
H	11	8	8[b]	0	12	0	0	22.525	0.0	≃ + 80
J	6	8	8[b]	0	12	0	0	22.525	0.0	Sub
M	5	8	8	0	12	0	0	26.663	4.138	Sub
N	5	8	8	8	12	8	0	26.663	4.138	Sub
O	5	8	12	12	12	12	0	26.663	4.138	Sub
TE	5	8	12	12	12	12	8	26.663	4.138	- 4.21
52	5	8	12	0	12	12	8	26.663	4.138	Sub
53C	5	8	12	12	12	12	8	26.335	3.810	+ 27.78
E	5	8	12	12	16	12	8	26.335	3.810	+ 73.58
F	5	8	12	12	16	0	8	26.335	3.810	Sub
G	5	8	12	12	16	4	8	26.335	3.810	+ 18.51
H	5	8	12	12	16	8	8	26.335	3.810	+ 58.76
54A	4	8	12	12	16	12	0	22.525	0.0	≃ + 300
B	4	8	12	12	16	12	0	23.457	0.932	≃ + 175
C	4	8	12	12	16	12	0	24.728	2.203	

a. Spacing is between cylinders only. The concrete is always in contact with cylinder flanges.
b. 8 in. by the side of 4 cylinders only.

3 x 3 Array, Concrete Reflected Composite Basic Summary

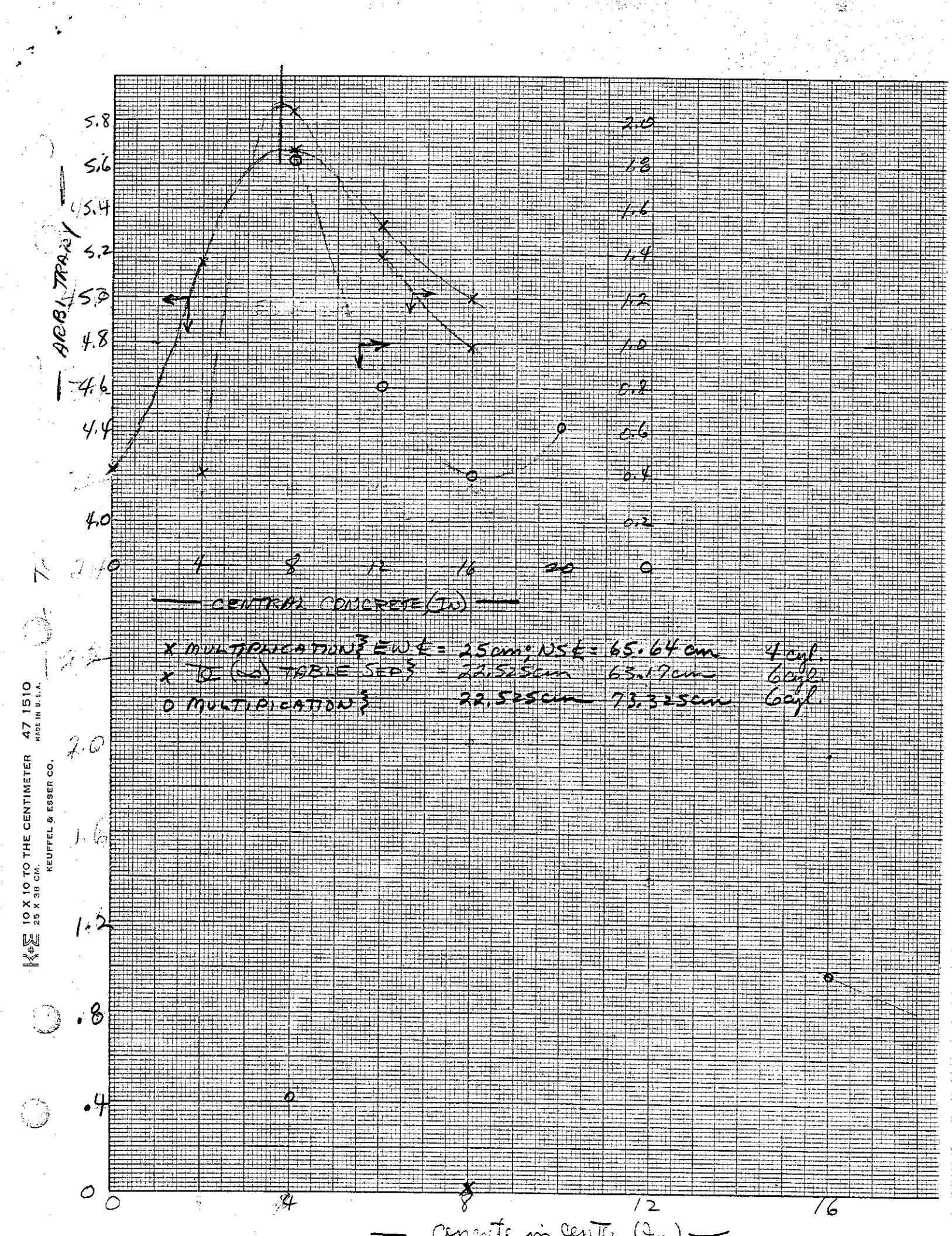
Run Number	Reflector Sides (in.) B	W	S	E	N	T	Cylinder ℄ to ℄ (cm)	Spacing[a] Flange-to Flange (cm)	(ϕ) Reactivity Direct or Calculated To Closed	(ϕ) Value of Concrete Change
49B	8	8	8	8	8	0	30.780	8.255	≃ + 90	
D	8	8	8	8	8	0	31.186	8.662	+ 0.14	
E	8	8	8	8	8	8	31.186	8.662	≃ + 159	~ 159(T)
F	8	8	8	8	8	4	31.186	8.662	≃ + 126	~ 33

a. Flange to Concrete always = 1/2 Flange to Flange.

2 x 2 Array, Concrete Reflected Composite Basic Summary

Run Number	Reflector Sides (in.) B	W	S	E	N	T	Cylinder ℄ to ℄ (cm)	Spacing[a] Flange-to Flange (cm)	(¢) Reactivity Direct or Calculated To Closed	(¢) Value of Concrete Change
41a	8	8	8	8	8	0	22.525	0.0	≃ + 160	--
M	8	8	8	8	8	0	23.130	0.605	- 99.62	--
O	8	12	12	12	12	0	23.130	0.605	+ 205	+ 305
P	8	12	16	16	16	0	23.130	0.605	+ 250	+ 44.88
Q	8	12	16	16	16	8	23.130	0.605	+ 272	+ 22.29(T)
R	8	12	12	12	12	8	23.130	0.605	--	- 19.79(T)
V	8	8	8	8	8	8	23.130	0.605	- 74.24	--
42A	8	8	8	8	8	8	22.843	0.318	+ 25.61	--
B	8	8	8	8	8	0	22.843	0.318	+ 16.55	- 9.06(T)
43A	8	8	8	8	8	0	22.684	0.159	+ 81.0	
B	8	8	8	8	8	8	22.684	0.159	~ 95.0	13.58(T)
44C	8	8	8	8	8	0	25.700	3.175	- 99.9	--
45A	8	12	12	12	12	0	25.700	3.175	+ 140	240
46A	8	12	16	16	16	0	25.700	3.175	≃ 182	42.09
B	8	12	16	16	16	8	25.700	3.175	≃ 182	28.75(T)
C	8	12	12	12	12	8	25.700	3.175	≃ 182	- 28.06(T)
46F	8	8	8	8	8	8	25.700	3.175	- 102.71 ?	?
48C	8	8	8	8	8	8	25.014	2.489	- 20.16	--
E	8	8	8	8	8	0	25.014	2.489	- 33.75	- 13.59(T)

a. Flange to Concrete always = 1/2 Flange to Flange.


— ARBITRARY —
5.8
5.6
5.4
5.2
5.0
4.8
4.6
4.4
4.0
2.0
1.6
1.2
.8
.4
0
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
4
8
12
16
20
0
0
4
8
12
16
— CENTRAL CONCRETE (TW) —
— concrete in centre (Tw) —
X MULTIPLICATION } EW t = 25cm ; NS t = 65.64 cm 4 cyl.
X TABLE SEP } = 22.525cm 65.17cm 6 cyl.
O MULTIPLICATION } 22.525cm 73.325cm 6 cyl.
KE 10 X 10 TO THE CENTIMETER 47 1510
25 X 38 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.